VOLUME LV NUMBER TWO

THE NATIONAL GEOGRAPHIC MAGAZINE

FEBRUARY, 1929

CONTENTS

TWENTY-FOUR PAGES OF ILLUSTRATIONS IN FULL COLOR

Buenos Aires to Washington by Horse
With 76 Illustrations — A. F. TSCHIFFELY

Twin Stars of Chile
With 35 Illustrations — WILLIAM JOSEPH SHOWALTER

Scenes of Beauty in Copper Land
25 Natural-Color Photographs — JACOB GAYER

Cruising to Crete
With 16 Illustrations — MARTHE OULIÉ and MARIEL JEAN-BRUNHES

Where Ancient Sea Kings Held Sway
14 Natural-Color Photographs — MAYNARD OWEN WILLIAMS

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TO carry out the purposes for which it was founded forty-one years ago the National Geographic Society publishes this Magazine. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resulting given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the expedition of Admiral Peary, who discovered the North Pole, and has contributed $25,000 to Commander Byrd's Antarctic Expedition.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members to the Government when the congressional appropriation for the purpose was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people.

THE Society has conducted extensive excavations at Pueblo Bonito, New Mexico, where prehistoric peoples lived in vast communal dwellings before the days of Columbus; it is sponsoring an ornithological survey of Venezuela, and is maintaining an important photographic and botanical expedition in Yunnan Province, China.

TO further the study of solar radiation in relation to long range weather forecastings, The Society has appropriated $60,000 to enable the Smithsonian Institution to establish a station for four years on Mt. Brukkaros, in Southwest Africa.

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Division of General Motors

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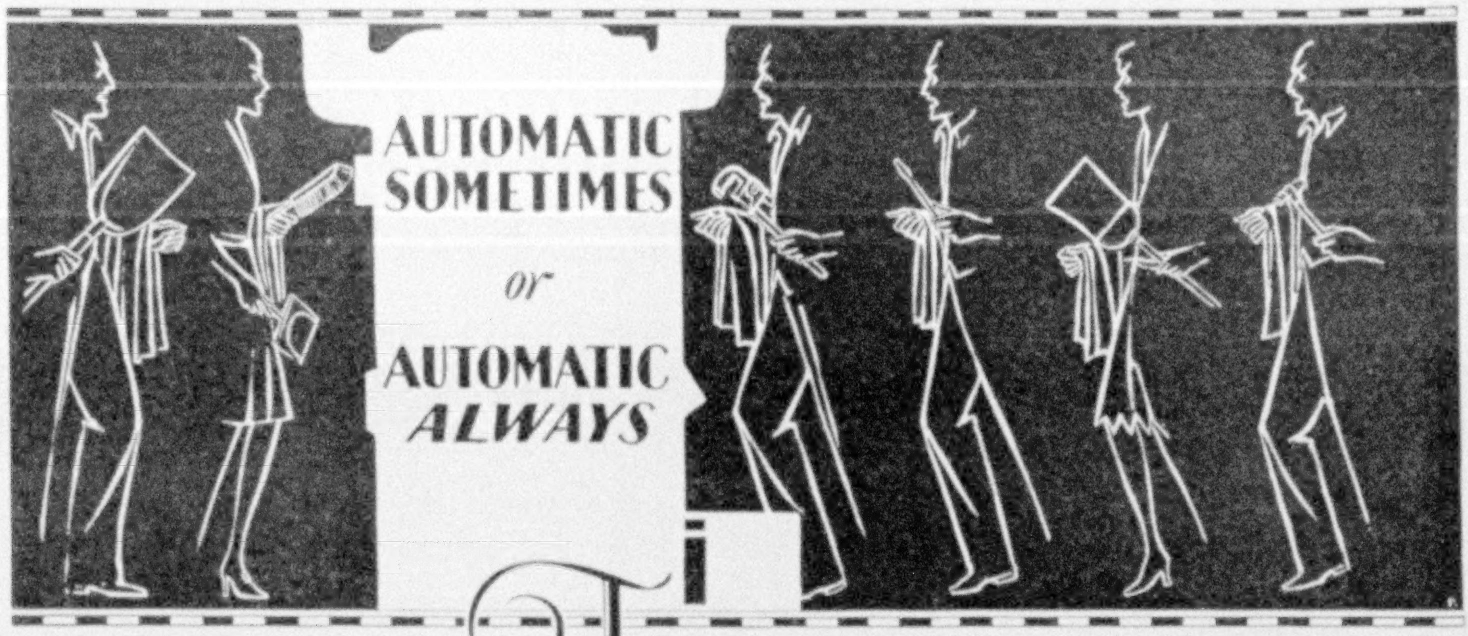
LA SALLE



THERE are two ways in which you can be a slave to your furnace room—one is by playing waiter, nurse and chambermaid to a coal furnace—the other is by playing mechanic to a complicated "automatic" heating plant. Either is permissible if you have nothing better to do with your time.

Hand-fired heating plants, of course, are admittedly makeshifts which are being replaced or abandoned by the thousands each year. Of automatic heating systems there are some which are "Automatic" principally in name—others, comparatively few, which are automatic in practice.

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In the first place, it has no motors, blowers, pumps or other mechanisms to require servicing a la your automobile. In the second place, it is truly automatic in that it "orders its own fuel" and hence doesn't require its owner to play watchdog to a fuel bin or storage tank. In the third place, it *stays* automatic because a Bryant Boiler or Furnace embodies no complicated revolving mechanisms to wear out or require frequent servicing—making it a long-time investment with little or no depreciation.

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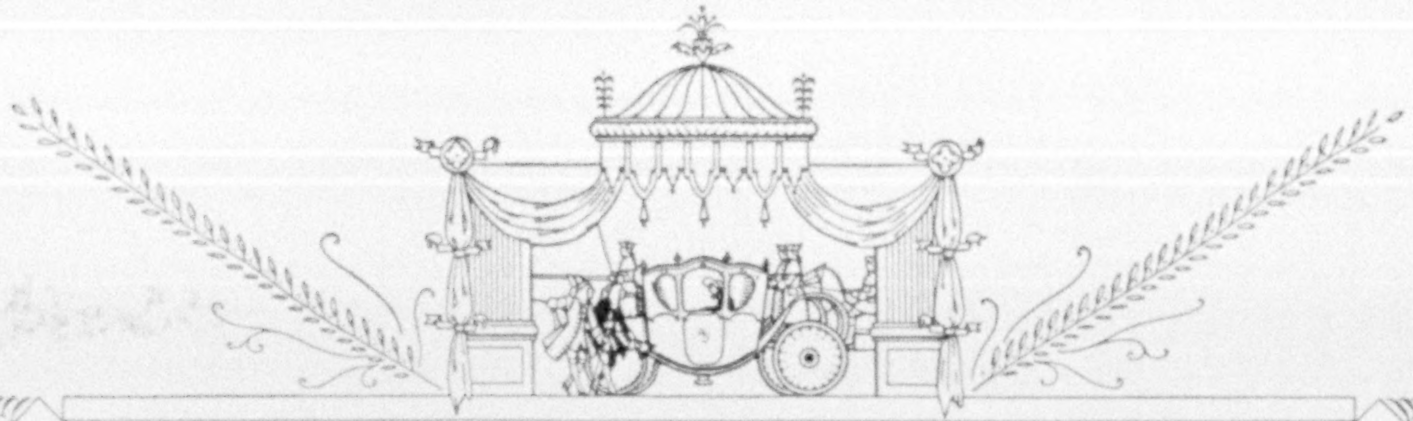

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Nowhere in all the world will you find expressed in motor cars the distinction, individuality and prestige so inseparably associated with the new Fleetwoods. ¶ These supreme examples of the coachcrafters' art are offered for that clientele which seeks in a motor car the precise interpretation of its own personal tastes and preference in body styles, color, trim, upholstery and appointments. ¶ That the exacting motor car buyer might counsel with professional coachwork designers just as he counsels with his architect and interior decorator in the construction and embellishment of his home—General Motors acquired not only the plant and properties of the Fleetwood Body Corporation but the highly specialized services of those Fleetwood master craftsmen who have devoted long years to fashioning coachwork of surpassing excellence.

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Fisher first created the closed body at reasonable prices twenty years ago—and in every price division today, Fisher is creating new, finer beauty, durability and body value in the brilliant cars which are listed herewith.

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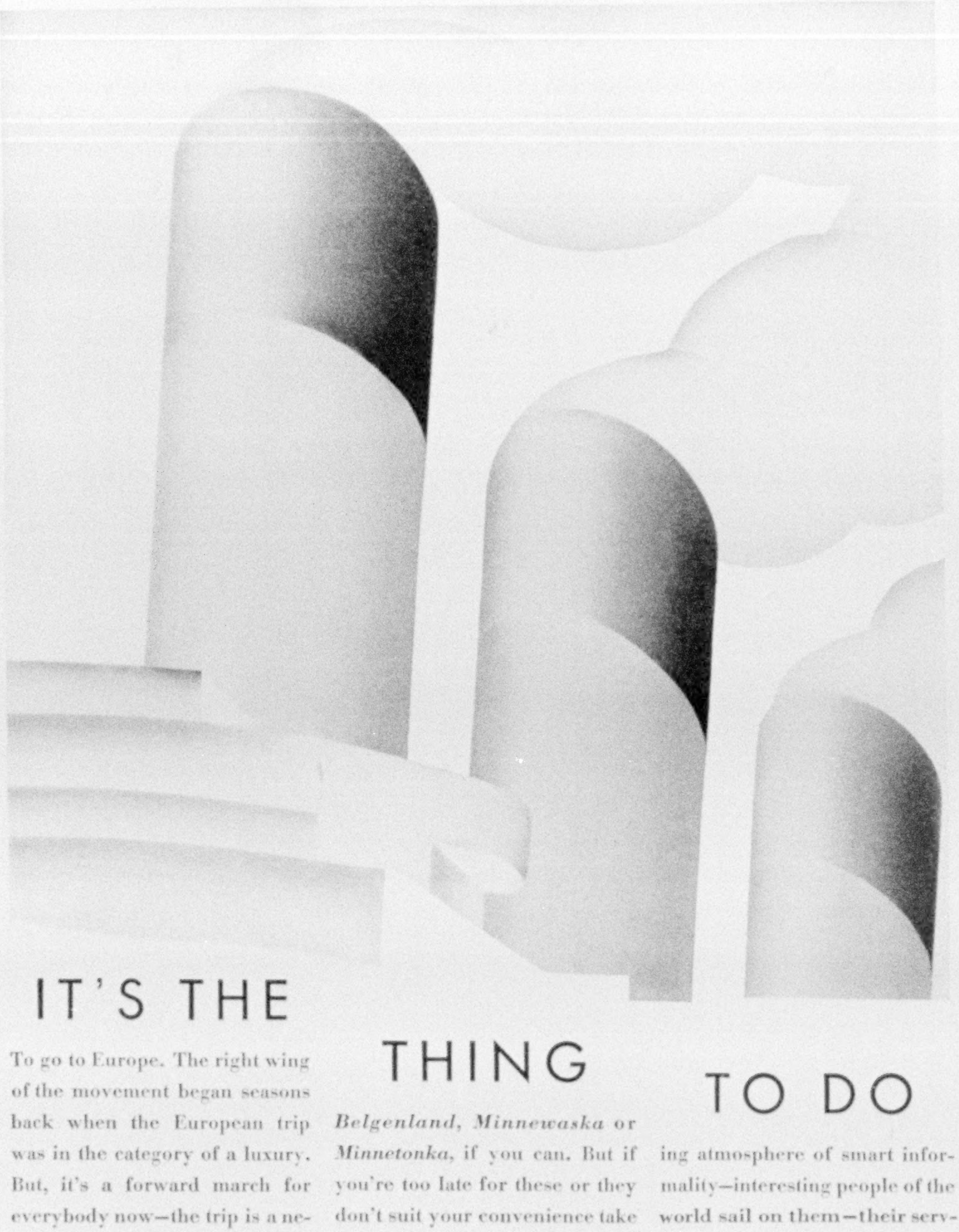

IT'S THE THING TO DO

To go to Europe. The right wing of the movement began seasons back when the European trip was in the category of a luxury. But, it's a forward march for everybody now—the trip is a necessity. It is, if you want to keep up with the times. Book on the *Majestic, Olympic, Homeric, Belgenland, Minnewaska* or *Minnetonka,* if you can. But if you're too late for these or they don't suit your convenience take any White Star, Red Star or Atlantic Transport liner. Every one of them has the same charming atmosphere of smart informality—interesting people of the world sail on them—their service and cuisine are impeccable. You'll have the assurance that no one has ever traveled better.

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RED STAR LINE · ATLANTIC TRANSPORT LINE

INTERNATIONAL MERCANTILE MARINE COMPANY

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Packard men bear the imprint of the Packard organization. They are selected and schooled for but one quality of work and service. It shows, and it pays—both them and Packard.

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For a single standard of high quality is ever uppermost in the minds of the Packard management—and the Packard organization is the guardian of a priceless reputation.

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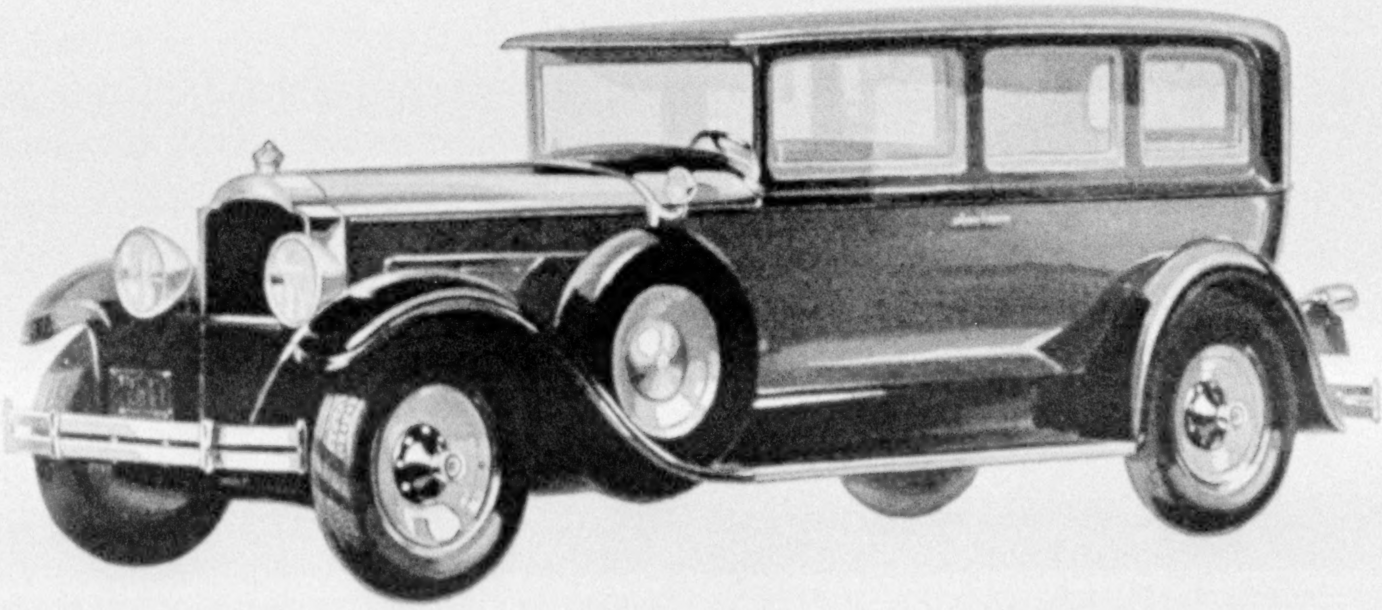

As your fingers meet the responsive keys of the Royal Portable Typewriter your thoughts take life in neat, clear type. True ease of thought expression . . . real inspiration! Students quickly realize these advantages in their improved grades. For the whole family, too, a life-time of helpful service is built into this sturdy little writing machine. Price $60, complete.

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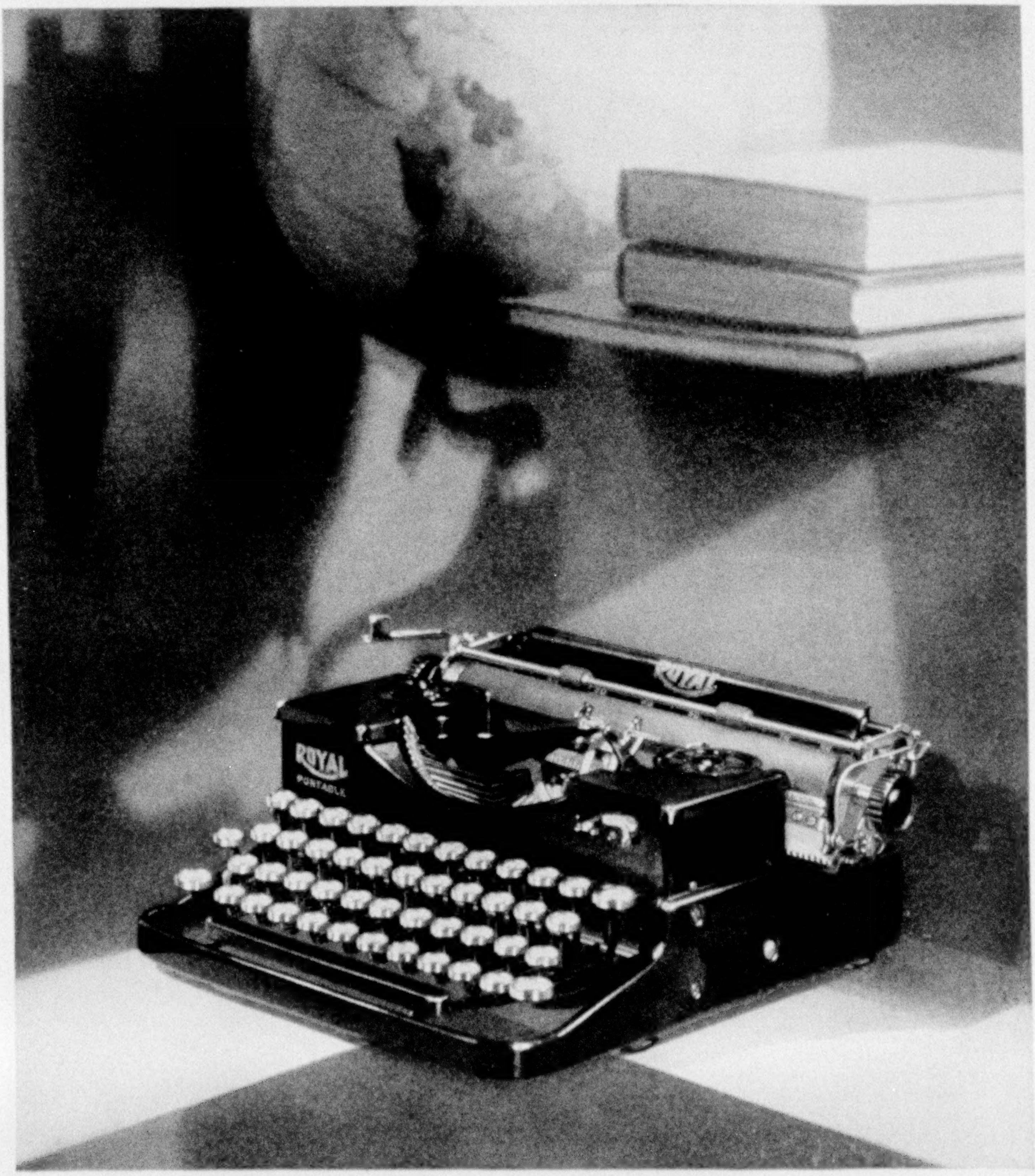
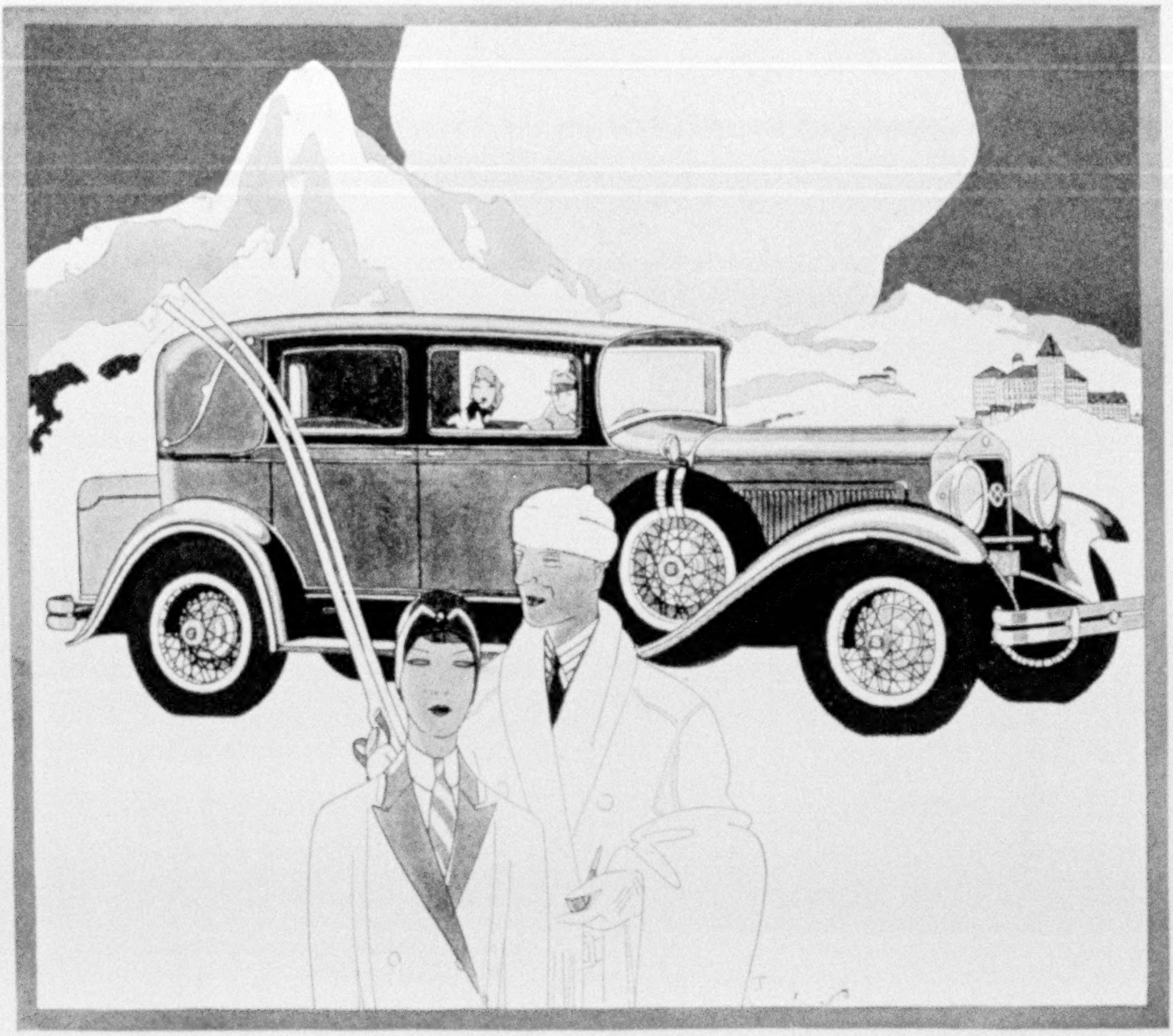




THE NEW PRESIDENT EIGHT BROUGHAM FOR FIVE

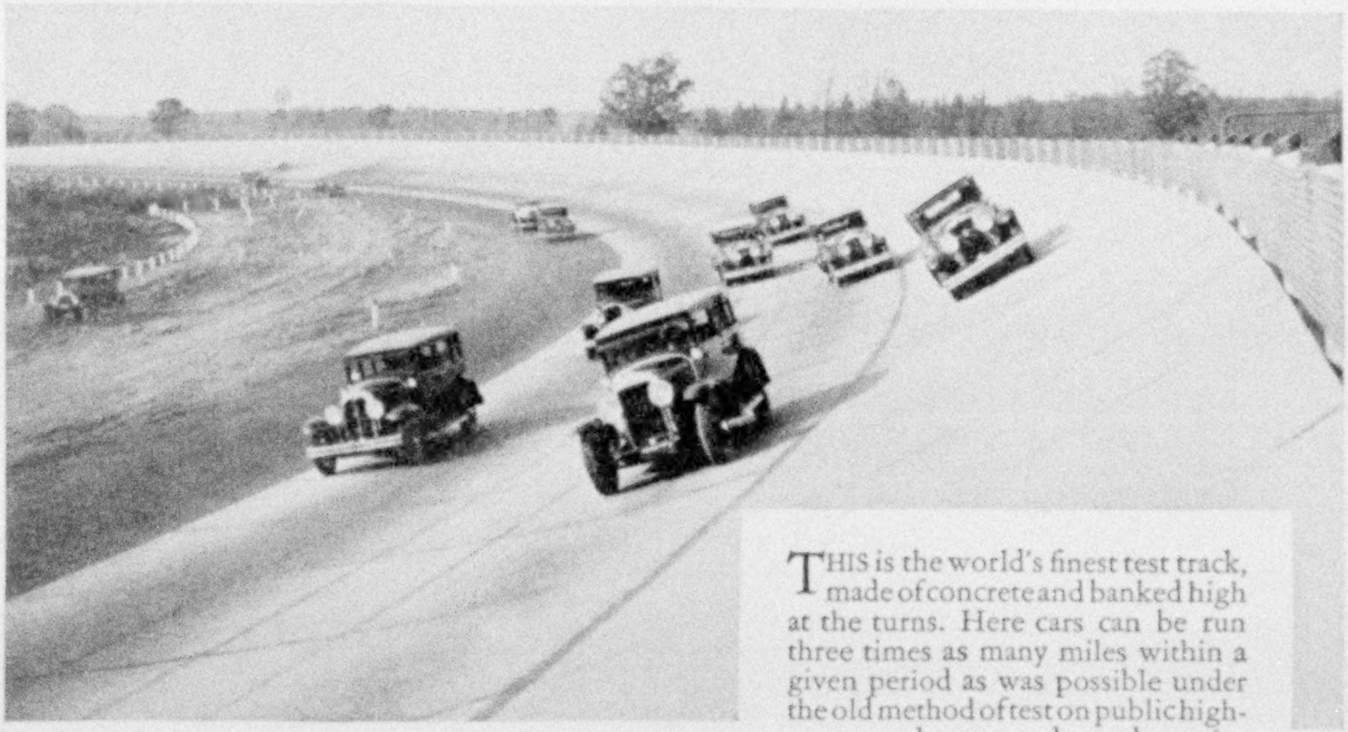
BY their new, trim, alert smartness, quite as pronouncedly as by their deeds and deportment, Studebaker's great new sixes and eights look every inch the champions they are. The fleetness and stamina that enable Studebaker to hold *every* official stock car record for speed and endurance, have been splendidly interpreted in body designs of original beauty. Each line, each curve, each modish color scheme, bespeaks the surpassing performance typical of Studebaker-built motor cars. And fully as gratifying as their behaviour in town or on the open road, are the prices made possible by Studebaker's One-Profit manufacture.

STUDEBAKER

Builder of Champions

The *finest test track* for automobiles

No. 1. Inside pictures of the General Motors Proving Ground



THIS is the world's finest test track, made of concrete and banked high at the turns. Here cars can be run three times as many miles within a given period as was possible under the old method of test on public highways—and any speed can be maintained day or night.

THE Proving Ground occupies 1268 acres near Milford, Michigan, convenient to all General Motors' car divisions. It is a great "outdoor laboratory" where automobiles can be tested in a scientific manner under conditions that are exactly comparable. Specially constructed roads and hills duplicate every driving condition.

At the Proving Ground cars of different American and European makes are tested after they are put on the market, thereby enabling General Motors to know precisely how its products compare with others in their respective price classes.

Here also the General Motors car divisions test and prove their new models before they are offered to the public.

The tests involve speed, power, endurance, braking, riding comfort, handling ease, fuel, oil and tire consumption, body style—every phase of car construction and performance. And claims and opinions are reduced to *facts.*

A MOTION PICTURE showing the Proving Ground in actual operation may be borrowed in lengths of one, two or four reels, free of all charges except those of transportation. Write to Advertising Department, General Motors, Detroit.

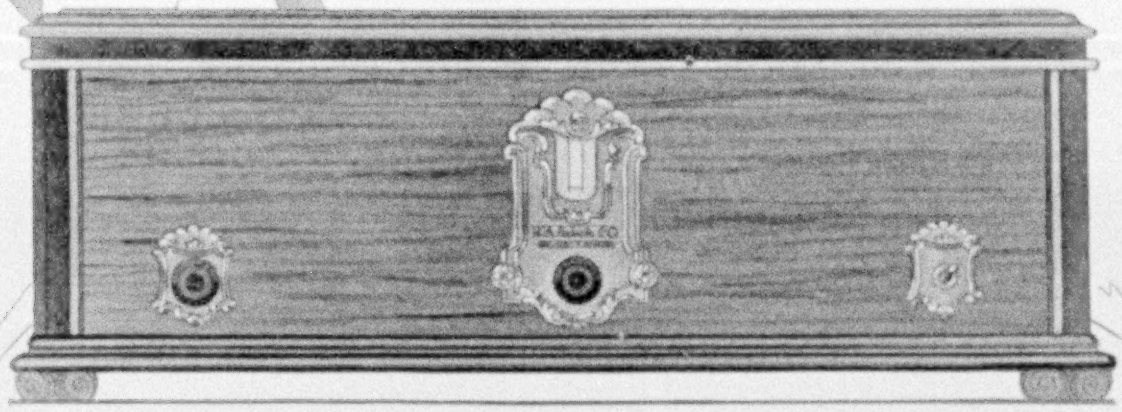
CHEVROLET · PONTIAC · OLDSMOBILE · OAKLAND

BUICK · LaSALLE · CADILLAC · *All with Body by Fisher*

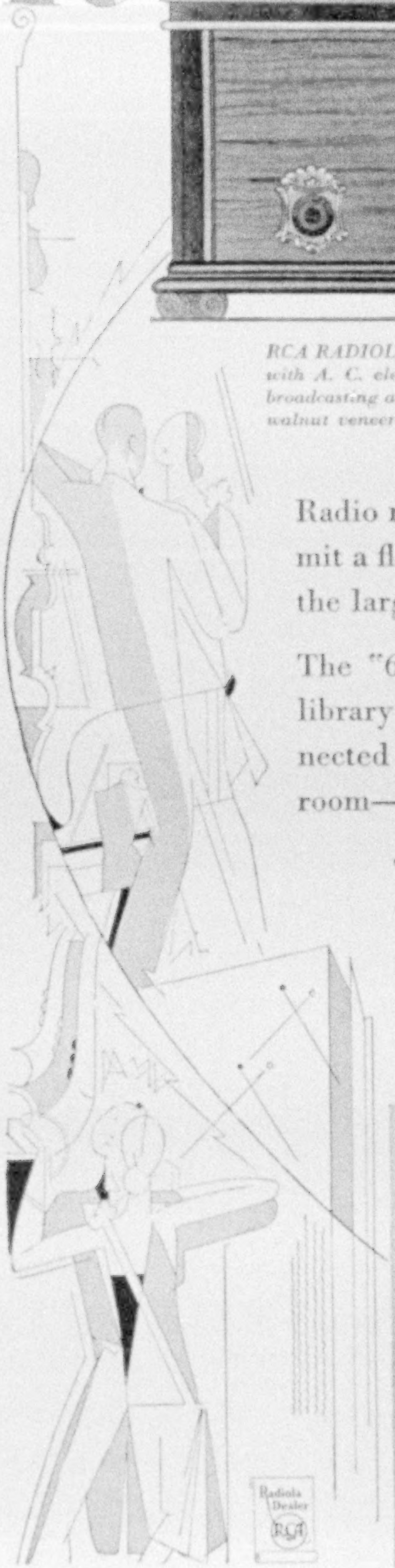
FRIGIDAIRE—*The Automatic Refrigerator* · DELCO-LIGHT *Electric Plants* · GMAC *Plan of Credit Purchase*

RCA RADIOLA 60

SUPER-HETERODYNE



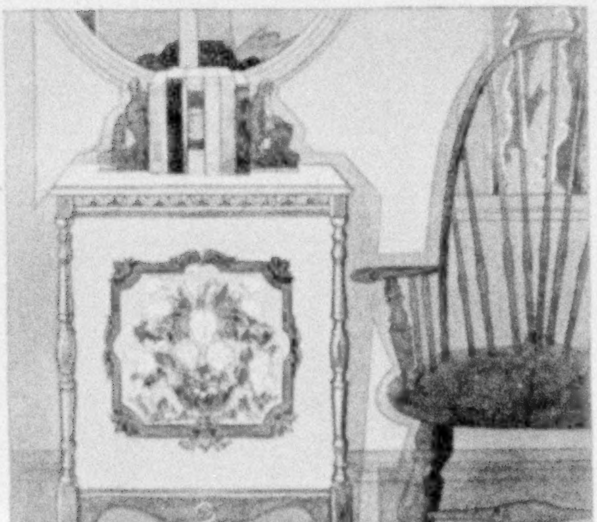
RCA RADIOLA 60—Beautifully designed table model of new Radiola Super-Heterodyne with A. C. electric operation. Single control with illuminated dial. Ideal for congested broadcasting areas—highly sensitive for places remote from broadcast stations. Two-toned walnut veneered cabinet. An instrument of wonderful musical range and tone fidelity
$147 (less Radiotrons)

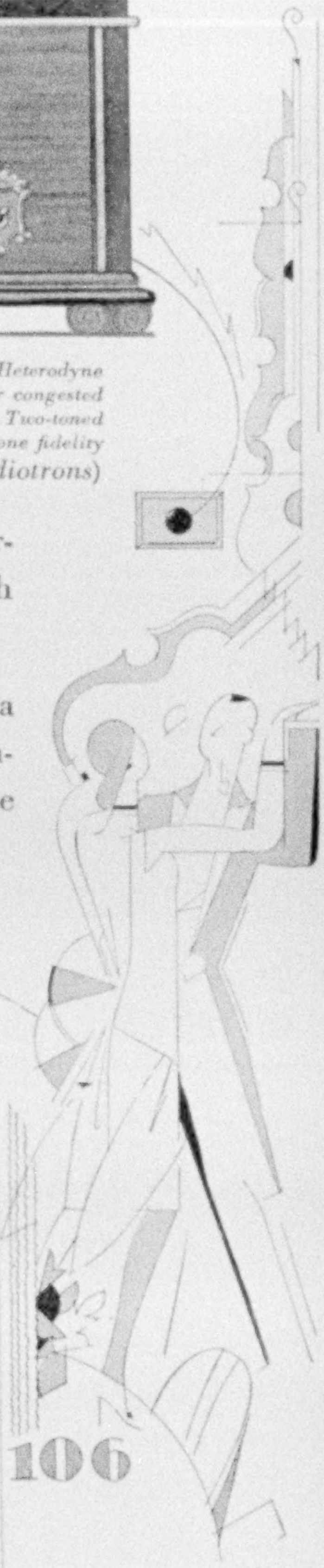


Radio receiver and speaker as separate units permit a flexibility in arrangement not possible with the larger cabinet combinations.

The "60" Super-Heterodyne may be put on a library shelf or a small side table, and be connected with the speaker placed anywhere in the room—or in another room.

The best reproducer to use with the "60" is the new "106" Electro-Dynamic. This is the same type as that used in the de luxe cabinet models of the new Super-Heterodynes.





Buy with confidence where you see this sign

RCA ELECTRO-DYNAMIC SPEAKER 106—The incomparable reproducing instrument of the type used in the new cabinet Radiolas now available as a separate unit. Operates from A. C. house current. A beautiful little piece of furniture as well as a reproducer of amazing range and tone. *$88*

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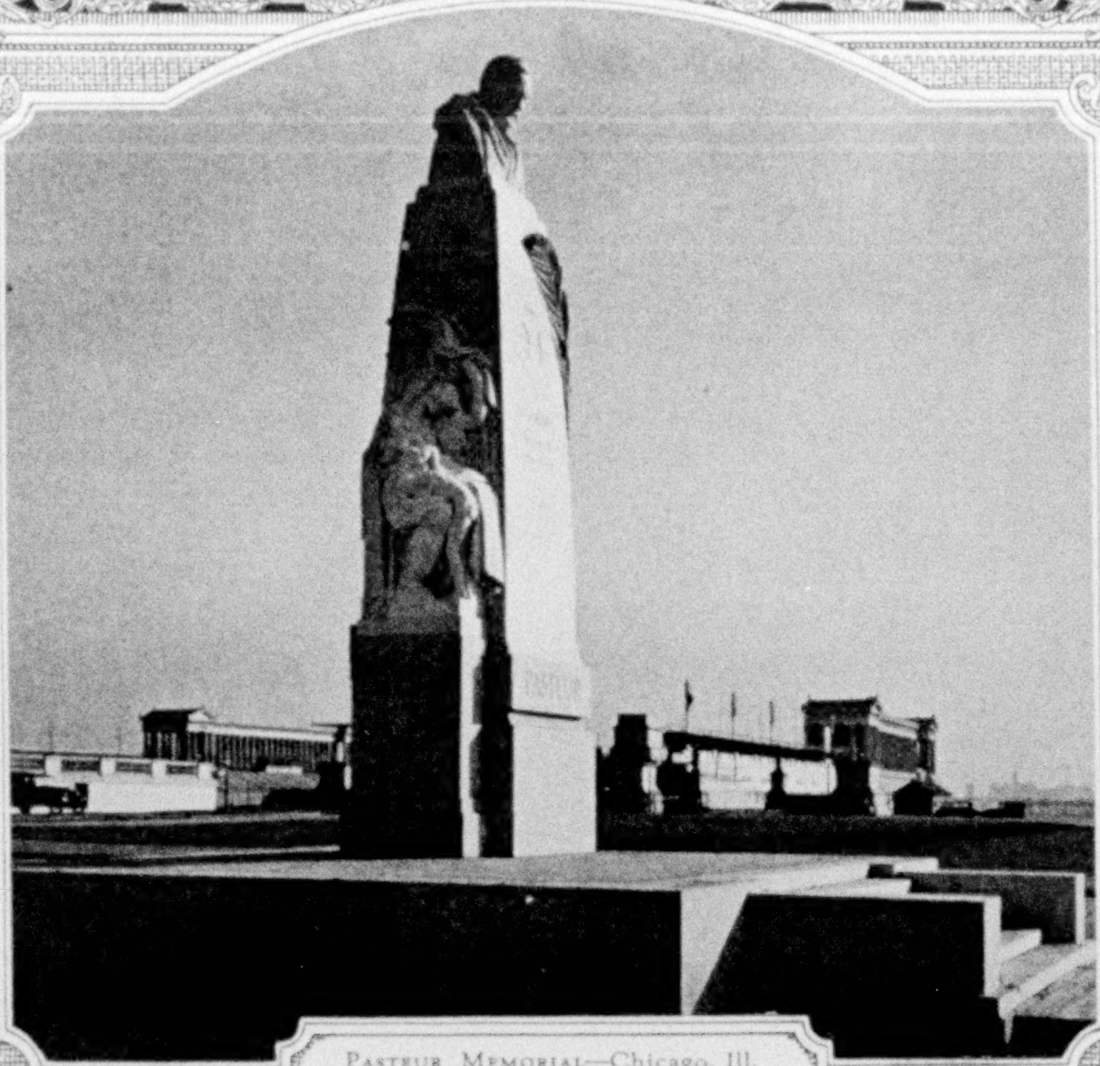

Pasteur Memorial—Chicago, Ill.
Bennett, Parsons & Frost, Architects
Leon Hermant, Sculptor

PASTEUR — *immortalized for Posterity in Georgia Marble*

ON the face of this beautiful marble shaft appears the simple yet expressive inscription—"Erected to Louis Pasteur, Servant to Humanity, by the People of Chicago." All civilization is debtor to this Frenchman, whose discovery has saved the lives of thousands each year.

No material could so well interpret the beauty and character of the sculptor's design, and preserve its delicate, clear-cut carving for posterity, as White Georgia Marble, for Georgia Marble is the most beautiful and durable of all memorial stones.

Write for a copy of our memorial booklet
"That Memory May Live Forever"

Georgia Marble Company, Tate, Georgia

Atlanta Chicago Cleveland Dallas New York

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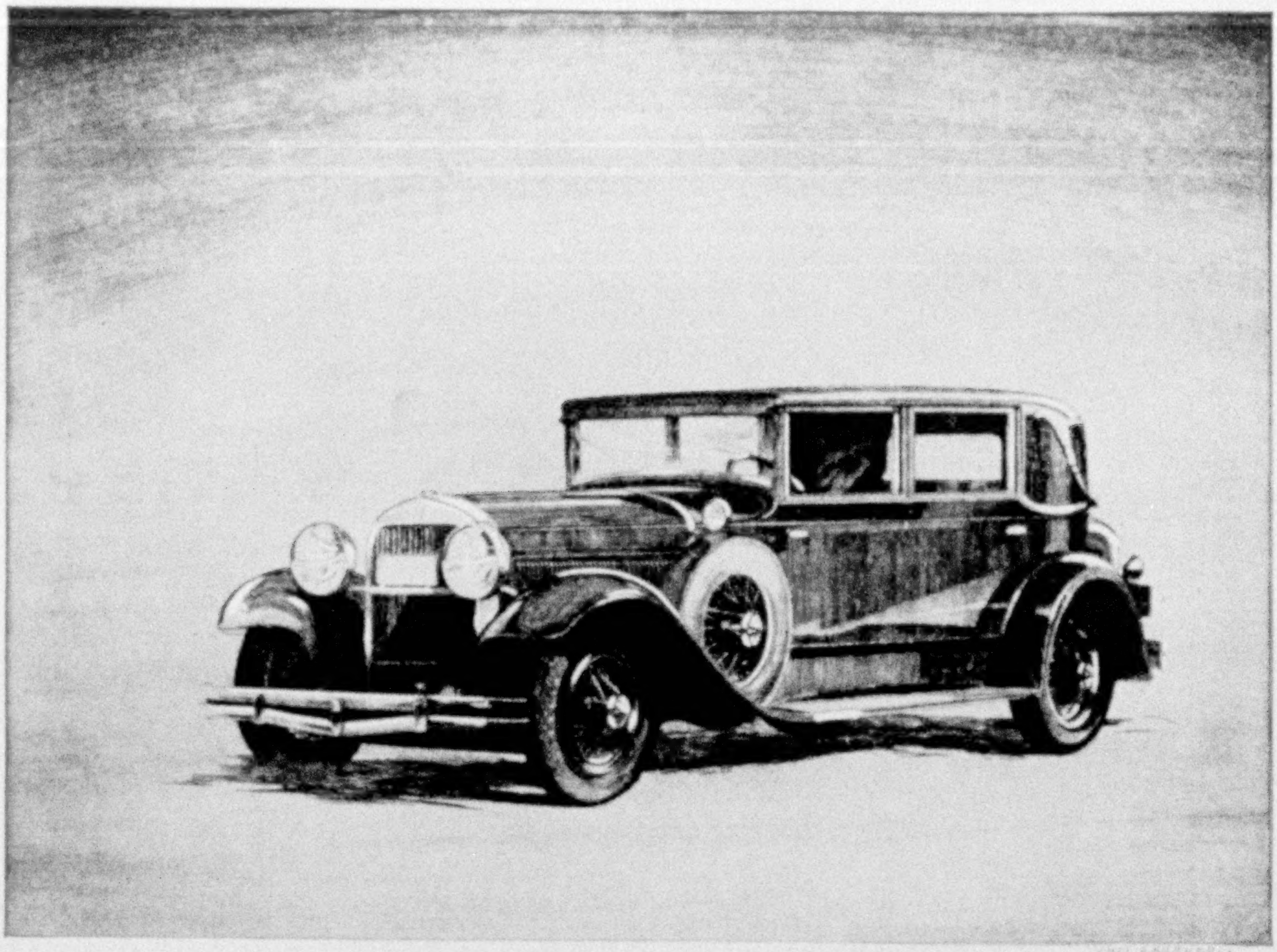

The Greater HUDSON in 14 Distinguished Body Types

COMMANDING beauty and richness distinguish each of the 14 body types available on the Greater Hudson.

The five-passenger Club Sedan here illustrated suggests the smartness that marks these new offerings. In every detail of finish and fittings they express the utmost in comfort and luxury.

Never in Hudson history have we presented such beautiful bodies. Never such value. Never such price advantage. And those who know motor leadership say that speaks for the entire industry.

To the wider number of models presented a further variety of personal choice is provided in two chassis lengths of identical quality.

On the standard chassis nine models are offered — the Coach, Standard Sedan, Coupe, Roadster, Phaeton, Town Sedan, Convertible Coupe, Landau Sedan and Victoria, ranging from $1095 to $1500 at factory. On the long chassis there are five models — the 4-passenger Sport Phaeton, the 7-passenger Phaeton, the 5-passenger Club Sedan, the 7-passenger Sedan and the 7-passenger Limousine, with a price range from $1850 to $2100 at factory.

92 DEVELOPED HORSE POWER — ABOVE 80 MILES AN HOUR

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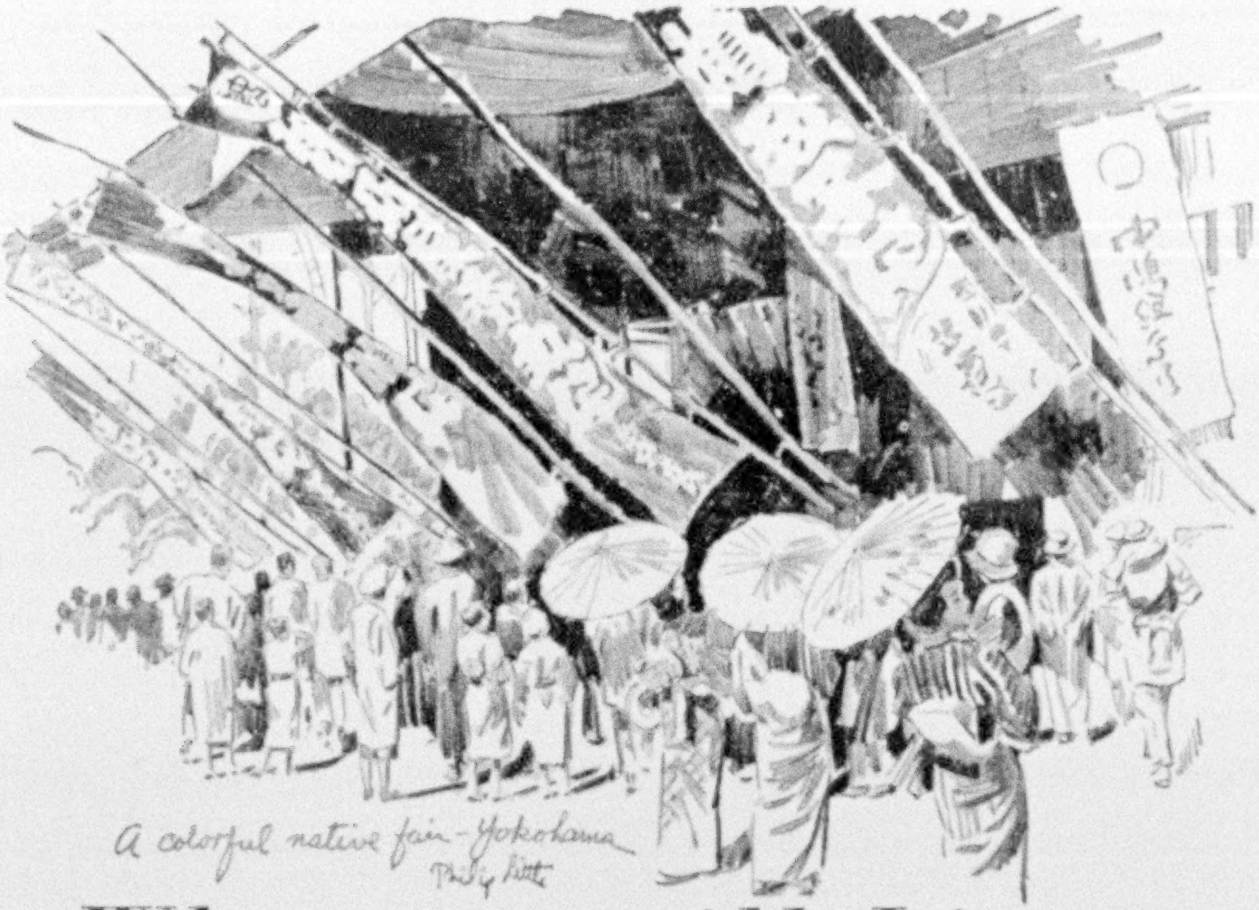

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Tour the world on your own schedule, stopping where you please for as long as you like. Enjoy the unique privileges of this steamship service.

Every fortnight a President Liner sails from Seattle for Japan, China, Manila and Round the World.

Every week a similar liner sails from Los Angeles and San Francisco for Honolulu, Japan, China and Manila. Then onward on fortnightly schedules to Malaya, Ceylon—with easy access to India—Egypt, Italy, France, New York, Boston and via Havana and Panama to California.

Palatial Liners, they are broad of beam, steady and comfortable. Spacious decks. Luxurious public rooms. A swimming pool. Outside rooms with beds, not berths. A cuisine famous among world travelers.

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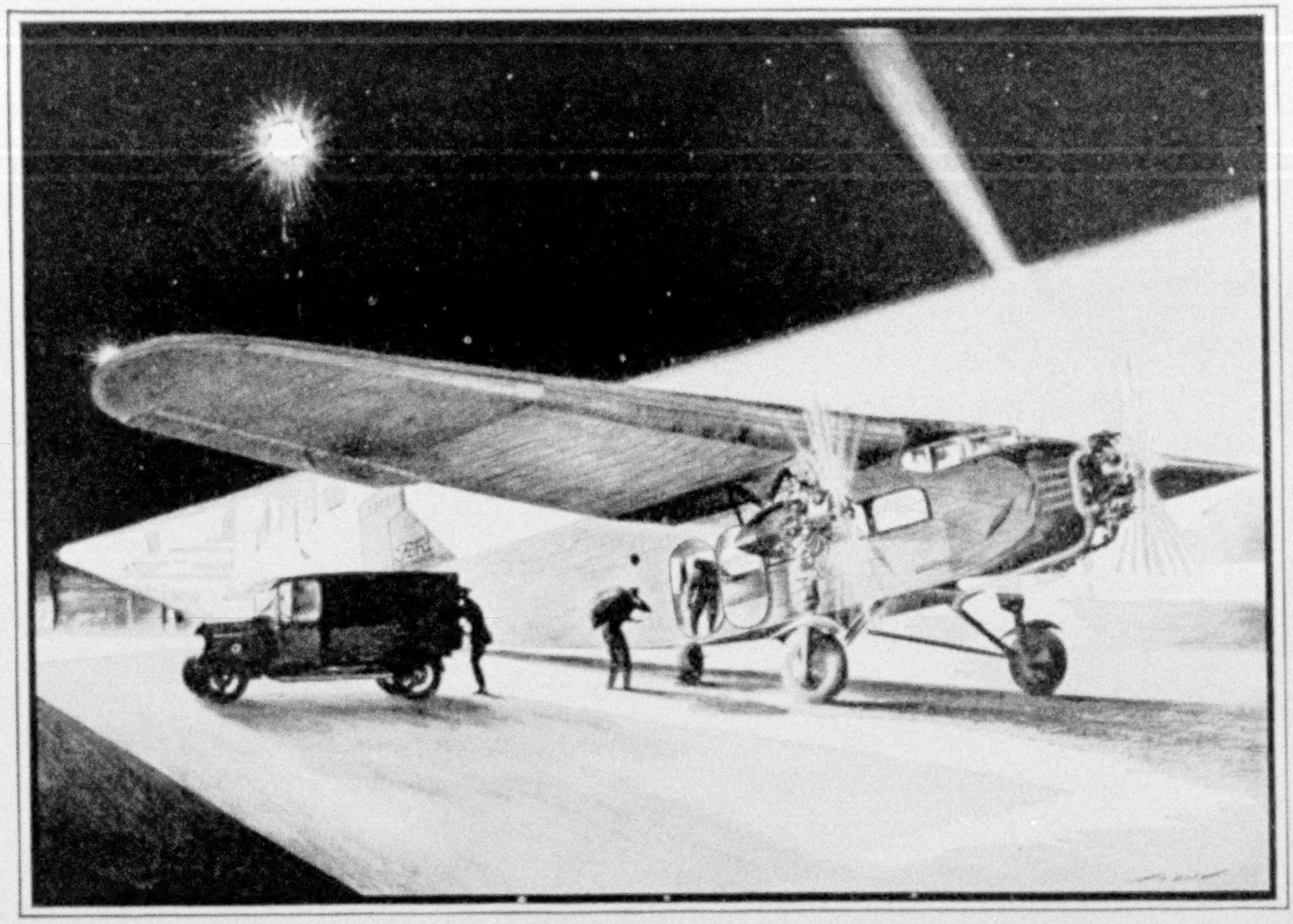
"Naturally you will wish to see Tokyo, a metropolitan area as populous as Chicago, the contrast of modern sky scrapers and factories and champion baseball teams with Shinto temples and paper house walls and ponderous wrestlers by the ancient Nipponese code. Nikko, certainly, with its cryptomerias, its sacred red lacquered bridge, its awesome temples and ancient royal tombs.

"Of Yamada-Ise, center of Shintoism, or the streams of pilgrims in costumes of olden days, climbing to the summit of Koyasan, sacred to Buddhism, you will carry memories all your days. Kyoto, the old capital, has much more than its world famed temples to recommend it. Nara, with its hundreds of chummy sacred deer and its peerless temple bell. . .

"Osaka, modern city of more than two million people, yet with many a reminder of the quaint days—or nearby Kobe, Japan's most important port, and a city in itself, where the liner will pick you up . . . unless . . ."

Harry A. Franck

World Traveler and Author of
A VAGABOND JOURNEY AROUND THE WORLD,
WANDERING IN NORTHERN CHINA,
EAST OF SIAM.



STAMPED AND DELIVERED—5c

In the last year of the seventeenth century if a man wished to send a message to a frontier post a few hundred miles from New York or Philadelphia, it was carried by a forest runner slipping through the Susquehanna wilderness in fear of his life.

Today ten thousand feet above the overgrown trails of the forest runners, the Night Mail pilot may look down and see in one sweeping glance, the clustered lights of New York, Philadelphia and Baltimore. From a hundred miles east of Cleveland he may see the lights of Pittsburgh and Buffalo! Here is a yardstick by which to measure progress; *for the man who can lengthen time and shorten distance may add generations of accomplishment to the span of a single life. . . .*

Three notable steps have advanced the recent progress of commercial aviation in America. First, July 1, 1924, when the Post Office Department began to carry transcontinental mail, via air. Second, when all mail contracts were handed over to private commercial air transport companies to operate without subsidies. Third, when in July, 1928, *the postage rate was cut to five cents per ounce!*

On the day the new rate was inaugurated, the volume of Air Mail southward from New York increased three hundred per cent. More than twice the normal quantity was carried out of Philadelphia. Within the week Des Moines had set a world's record by despatching 45,000 pieces in a single day!

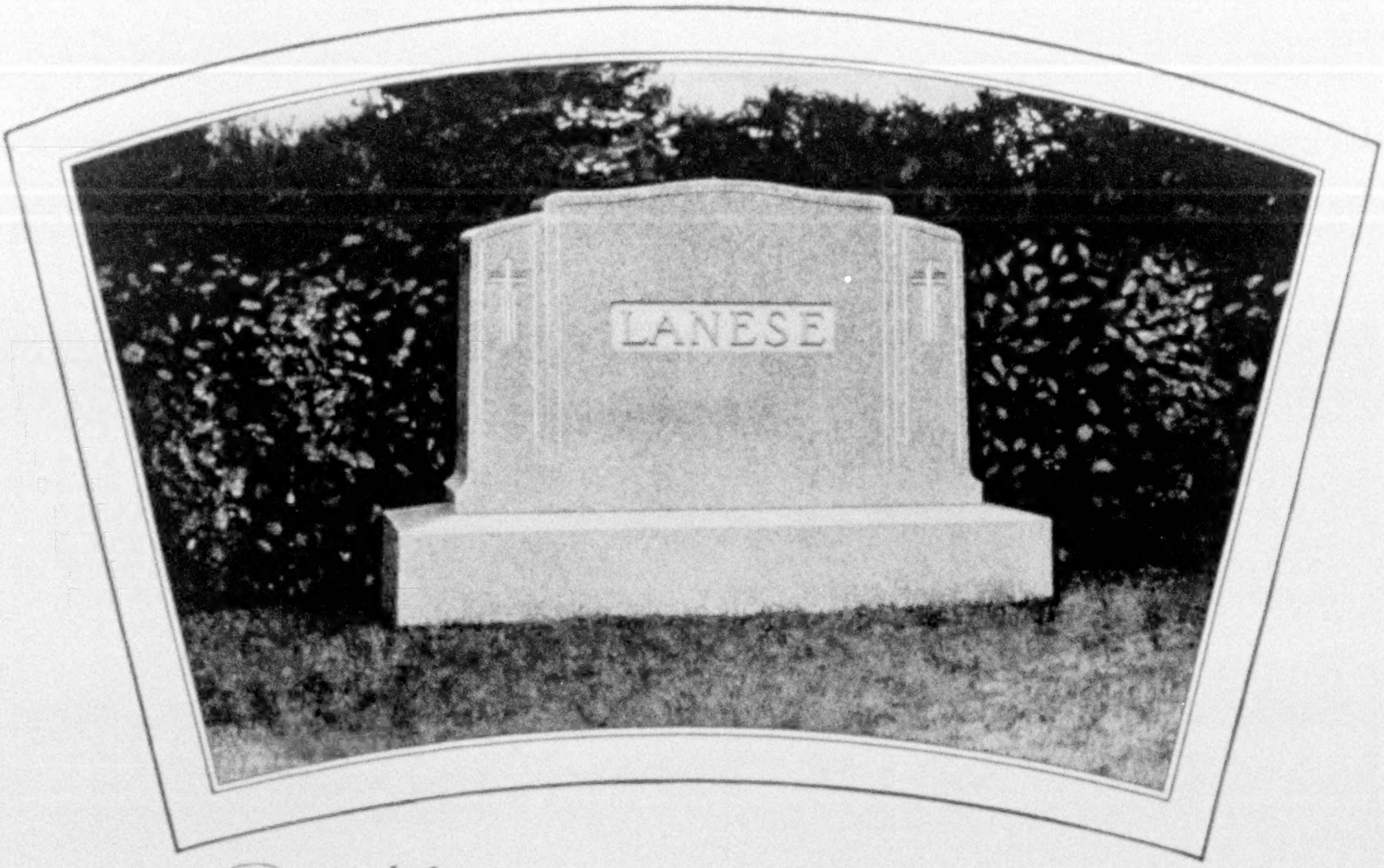
What share has business got in this?

Articles recently sent northward from Atlanta included: gabardine clothing, rugs and towels, soft drink samples, candy, cheese, peanuts, pencils, twine, sacking, shoes, brushes, and samples of seeds. . . . Out in Los Angeles a life insurance agent beat a local company to a new prospect by receiving a special form of policy from his home office in New York, via air, a day ahead of his West Coast competitor. . . . A great mail-order house in Chicago is expediting its correspondence and special deliveries through the air. . . . A single special Air Mail shipment, amounting to ten tons, or 350,000 mailing pieces, left Lansing, Michigan, on August 21st for Chicago. . . . Banks are saving thousands of dollars by sending their exchanges by air. . . .

Business men no longer ignore the fact that competitors may send letters from the Gulf of Mexico to the Great Lakes in 15 hours . . . from the Gulf to the North Atlantic in 24 hours . . . from the Atlantic to the Pacific in 31 hours . . . *at less than half the price of ordinary special delivery.*

Ford planes pioneered in mail service. And a survey of tri-motored, all-metal Ford planes today shows them in steady, dependable service as railroad auxiliaries, in transcontinental flying, in coastwise flying by the most successful commercial companies, and as carriers of great importance between the industrial cities of the Mid-West and the Lake Ports. *They have already winged their way over a million miles of successful commercial flying.*

FORD MOTOR COMPANY



Build while you live The purchase of a family memorial is too important to delegate to your survivors. Like the purchase of life insurance, the making of a will or creating a trust fund—the erection of a family memorial calls for careful thought and investigation. It calls for the same good judgment that you use in your business. We urge you not to leave this task to some one else. Act now—use the coupon below or write us in detail of the memorial you have in mind.

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Please send me full particulars of the Literary Guild plan and your new booklet, WINGS. No obligation to me, of course.

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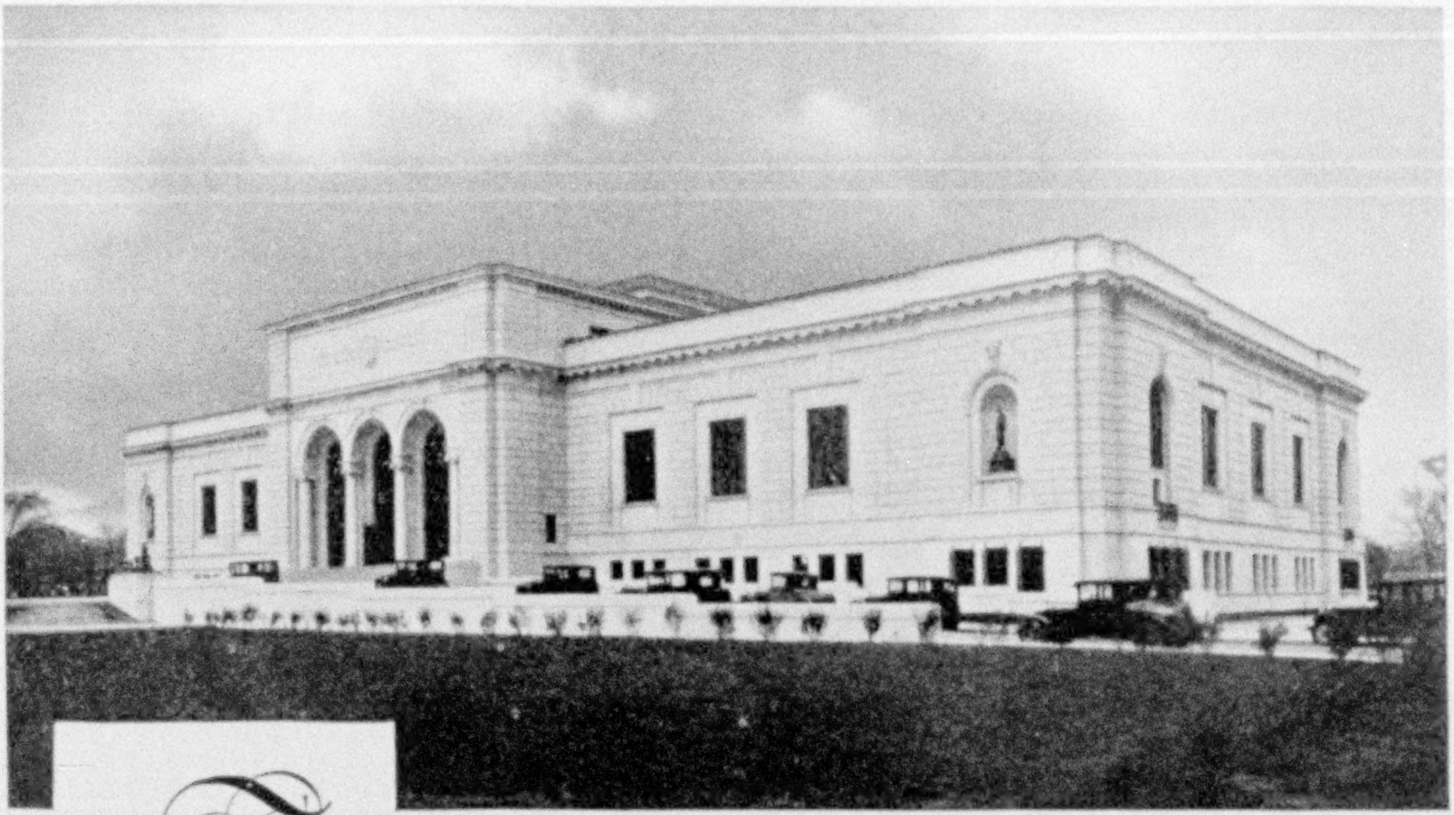

The Detroit Institute of Arts . . . *another of America's notable civic treasure-houses built of Vermont Marble (Imperial Danby). Architects: Paul P. Cret; Zantzinger, Borie & Medary*

THROUGH NOBILITY of design and material, great cities express the timeless permanence and high purpose of buildings devoted to the perpetuation of Art and Culture. Here, as elsewhere, men have used Vermont Marble when sculptural and architectural purposes required stone significant, superb and able to endure through unmeasured time.

Vermont Marble, proven by Government test, was selected for the Unknown Soldier's Tomb and for the massive all-marble structure of the Arlington Amphitheatre.

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VERMONT MARBLE

a VAST wonderland

Extending for hundreds of miles, snow-pockets and glaciers of the High Sierra are a never-ending summer vacation lure.

IF you start vacation planning now and send for the new All-Year Club book, your eagerness to be right out here in Southern California will admit of delay no later than early this summer. This book of 73 large photographs, beautifully done in rotogravure, so faithfully tells the Southern California story that only a vacation here will answer the longing.

Nowhere else in the world are combined so many fascinating nature-created sights. The High Sierra are but one thrill of many, for a few miles off the near-by shore islands rise from the blue Pacific like Capri itself! For 270 miles, the Southern California coast line, now rugged, now marked by broad, safe beaches, is a Riviera in your own America! Vast orange orchards laden with ripening golden fruit; Old Spanish Missions; the Big Trees, near-by mile-high mountains . . . all await your vacation visit this summer.

Summer days are rainless; thunder and lightning are practically unknown. Air is dry and free from humidity. Nights are cool. Blankets are a sleeping-comfort necessity . . . not one night in ten, *but ten nights out of eleven* . . . and all summer!

Night life in Los Angeles and Hollywood is unending in its pleasures. Gay hotels, cafes; great theaters; "Symphonies under the Stars" in Hollywood Bowl. Los Angeles County's oil industry alone is rated at a billion dollars. Agricultural products annually approximate $95,000,000. Plan to come directly to Los Angeles, then see the whole Pacific coast . . . at small increased cost.

Send at once for "Southern California through the Camera." It pictures what you will see here summer and winter.

Southern California

All-Year Club of Southern California, Dept. 2-E, Chamber of Commerce Bldg., Los Angeles, Calif.

Please send me your free book, "Southern California Through the Camera." Also booklets telling especially of the attractions in the counties which I have checked.

☐ Los Angeles ☐ Orange ☐ Riverside
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A new service

TO EVERY PENCIL USER

now offered by

EBERHARD FABER

WASTEFULNESS isn't popular today. But it's still prevalent on one so-called "small" item.

The pencil that doesn't please its user gets short shrift. *Five cents goes into the waste basket.* Insignificant? Figure it by the year, especially in a busy office.

Wherever a single type of pencil is employed for all purposes, time and temper are lost. Work suffers. Another kind of pencil is tried—with similar results.

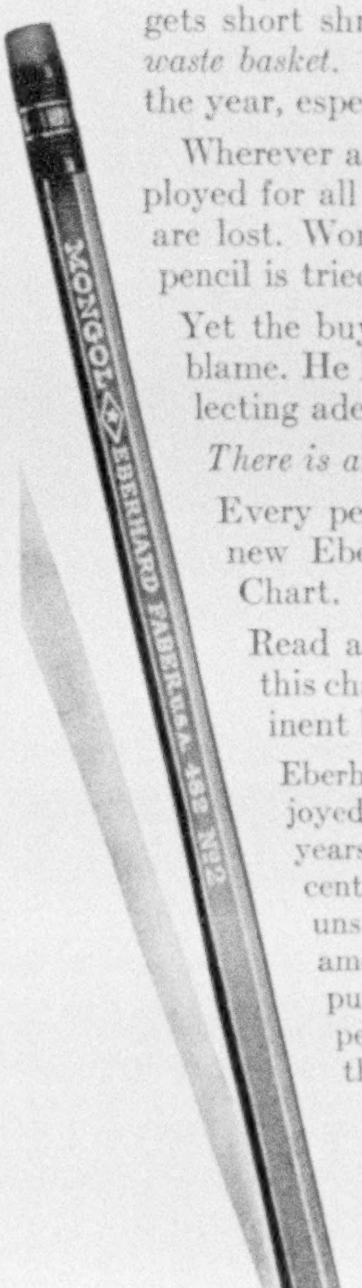
Yet the buyer hasn't been so much to blame. He has had no easy way of selecting adequate pencils.

There is an easy way now.

Every pencil need is covered by the new Eberhard Faber Pencil-Users' Chart.

Read at the right the opinions on this chart expressed by three prominent business executives.

Eberhard Faber pencils have enjoyed a quality reputation for eighty years. The *Mongol* was the first five-cent high grade pencil and remains unsurpassed. The *Van Dyke* leads among ten-cent pencils. For every purpose, Eberhard Faber makes pencils that satisfy the user and thus pay their way.



MONGOL NO. 2

The recognized business pencil of the world. Made in five degrees. Identified by the black tip with the gold band.

Mr. THOMAS HASTINGS, a leading New York Architect, says—

"Naturally architects must select pencils—essential tools of their profession—with special care.

"But I feel sincerely that even artists and architects will find such a selection guide useful.

"This applies all the more to others who heretofore have probably given comparatively little thought to the pencils they use. From experience I can say that the fitness of a pencil for its purpose makes a considerable difference in the effectiveness of its use."

Ask your stationer about this new service, and write on your own letterhead for the free chart, "The Right Pencil for the Right Use." Eberhard Faber, Dept. N-10, 37 Greenpoint Ave., Brooklyn, N.Y.

What prominent business men say about this new service—

Henry D. Brigham, Vice-President, Eaton, Crane & Pike—

"Even though pencils are a comparatively small item of expense, I feel that American business can undoubtedly save real money by adopting this new method of choosing exactly the right kind of pencil for each different use."

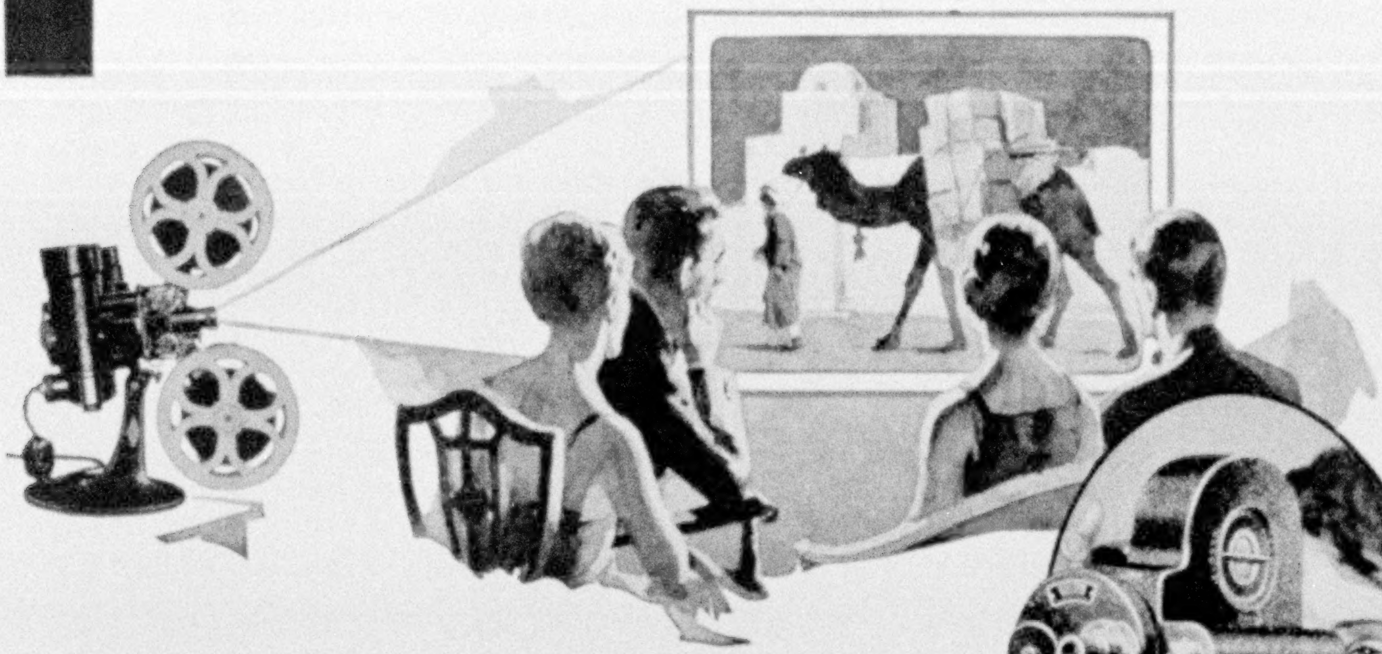
Raymond E. Jones, First Vice-President, Bank of the Manhattan Company—

"This is certainly in line with the modern business tendency toward standardization. There is a right way and a wrong way to buy anything, and it seems to me that Eberhard Faber has now shown us the right way to buy pencils."

M. B. Freeman, Purchasing Agent, Dennison Manufacturing Co.—

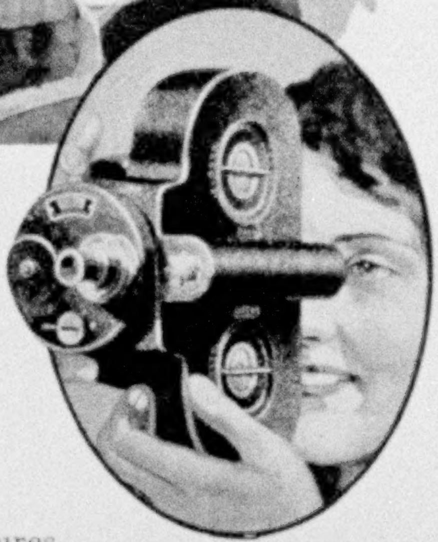
"It is high time we had a practical method of selecting pencils according to their uses—and here in a chart of this kind is just such a method."

FILMO MOVIES



bring the world to your home in

LIVING ACTION



"What you see, you get"

Filmo 70

As essential to your travels as steamship or railroad ticket is a Bell & Howell Filmo movie camera—if you are to derive fullest enjoyment from the trip. A ticket takes you *to* the scenes of your anticipation—Filmo *brings them back*, in action, exactly as you saw them.

Because of their unerring accuracy and watchlike precision, Filmo cameras—equipped with the highest quality lenses obtainable—yield beautiful, clear, travel movies, even under adverse light conditions which would discourage the taking of ordinary snapshots.

Filmo cameras are even easier to operate than a still camera. Simply look through the spy-glass viewfinder, press the button, and *what you see, you get.* No focusing for distance, no setting for time, no tripod or cranking necessary. *Anyone* can take movies with Filmo.

For almost a quarter of a century Bell & Howell have supplied the professional movie cameras used in producing feature pictures shown in "first run" theaters throughout the world. The owner of a Filmo camera, made by Bell & Howell, possesses the finest quality movie camera made.

Pocket Size

Filmo 75

For black and white pictures, Filmo Cameras use Eastman Safety Film (16 mm.)—in the yellow box—both regular and panchromatic—obtainable at practically all dealers handling cameras and supplies. Filmo Cameras and Filmo Projectors are adaptable, under license from Eastman Kodak Company, for use of Eastman Kodacolor film for home movies in full color. Cost of film covers developing and return postpaid, within the country where processed, ready to show at home or anywhere.

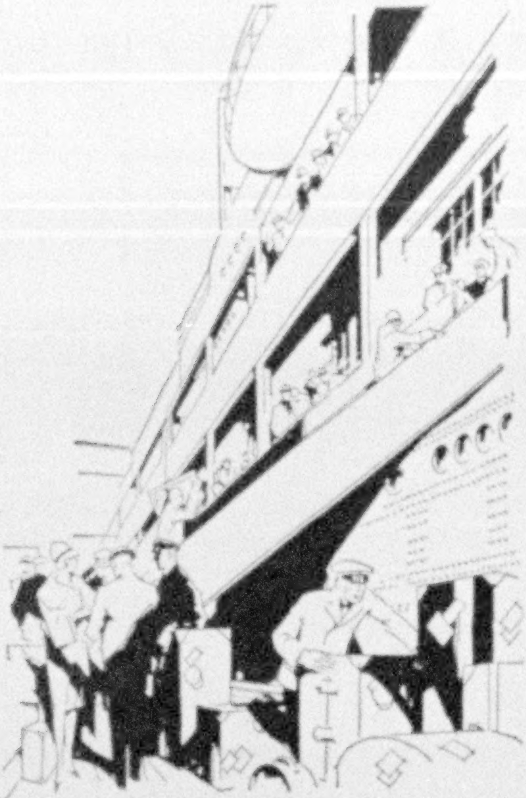
See a nearby dealer for Filmo demonstration or write to us for illustrated, descriptive Filmo booklet, "What You See, You Get."

BELL & HOWELL

Filmo

Bell & Howell Co.—Dept. B., 1817 Larchmont Ave., Chicago, Ill.—New York, Hollywood, London (B. & H. Co., Ltd.) Established 1907

EUROPE



What will your trip be like?

Will it be a failure or the successful realization of your fondest hopes? Will you return utterly disappointed or amazingly exhilarated by all the joys you have experience abroad?

The thrills and sights are always there, but it is the way you travel that counts. When you join an American Express Escorted Tour you become part of a delightful group for whom Europe is a great adventure. You follow a pleasure path mapped out for you in advance. No travel worries to bother you, to cause delays; no troubles with reservations, tickets, meals en route, baggage—only carefree vacation days packed rich with comfort and excitement... under the guidance of an experienced Tour Manager.

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Reproduction from a painting made on the estate of John N. Willys, Center Island, Oyster Bay, Long Island, New York, by Frank Swift Chase

There is no half-good in Tree Surgery

You would not employ a blacksmith to treat your teeth nor a carpenter to operate on your body. However expert they may be, they deal with inanimate objects and have no technical knowledge or skill with reference to the problems of living things.

You must buy Tree Surgery service on faith. Living trees of any reasonable size are almost priceless. If they require attention you cannot take any chances. This is a highly specialized profession, requiring adequate scientific knowledge and high personal skill that can come only from thorough training under master Tree Surgeons.

The Davey Company says to you with all possible emphasis that there is no half-good in the treatment of trees. This statement is made after more than half a century of experience by a national institution now doing a business of nearly $3,000,000 a year, and having in its employ more than a thousand real experts.

And yet this reliable service costs less than any professional work in America. 76% of Davey clients pay less than $100 each. 21,608 clients were served last year—between Boston and Kansas City and from Canada to the Gulf.

Furthermore, Davey Tree Surgeons are actually local to you. They are not sent to you from Ohio for your individual work: they are trained in Ohio and are carefully supervised regularly, but they live and work in your vicinity.

The Davey Company guarantees satisfactory service. You pay only for actual working time, plus the necessary materials and expressage. Your trees are certainly worth this reliable service.

Write or wire Kent, Ohio, for address of nearest representative, who will examine your trees without cost or obligation.

THE DAVEY TREE EXPERT CO., Inc., 178 City Bank Bldg., Kent, Ohio

Among prominent persons and institutions served by the Davey Tree Surgeons are the following:

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JOHN DAVEY
1846-1923
Father of Tree Surgery
Reg. U. S. Pat. Office

DAVEY TREE SURGEONS

MARTIN L. DAVEY, *President and General Manager*

Buy Later

First Make This Remarkable Test for 7 days . . . Prove This Unique Shaving Cream's Supremacy . . . *Buy* Only if Convinced. *Mail Coupon Now.*

GENTLEMEN:

Most manufacturers clamor for immediate sales. But we have found success in urging men *not* to buy. Rather, to find out at our expense if they like our product.

The great majority of men who make our test become regular users. Remember they, like you, were wedded to some other shaving cream before.

The coupon is for your convenience. Please send this one in. In fairness to yourself and to us.

How it was discovered

We asked 1000 men what their wishes were. They gave us four objectives.

To the 4 things men asked we added a fifth. Today we believe Palmolive Shaving Cream is supreme for shaving comfort. Men tell us no other compares.

These 5 things

The things you get in your 7-day test of Palmolive are things you have long sought:

1. Multiplies itself in lather 250 times.
2. Softens the beard in one minute.
3. Maintains its creamy fullness for 10 minutes on the face.
4. Strong bubbles hold the hairs erect for cutting.
5. Fine after-effects due to palm and olive oil content.

Now we ask a test

No doubt your present shaving preparation suits you—still there may be a better way. If there is you want to know it. So won't you let us prove, on *your* face, how excellent this unique product is? It's up to us to prove our point; you've lost nothing if we fail. Please mail the coupon now.

PALMOLIVE RADIO HOUR—Broadcast every Wednesday night—from 9:30 to 10:30 p. m., eastern time; 8:30 to 9:30 p. m., central time; 7:30 to 8:30 p. m., mountain time; 6:30 to 7:30 p. m., Pacific Coast time—over station WEAF and 39 stations associated with The National Broadcasting Company.

With the new unbreakable Bakelite top 4240

7 SHAVES FREE

and a can of Palmolive After Shaving Talc

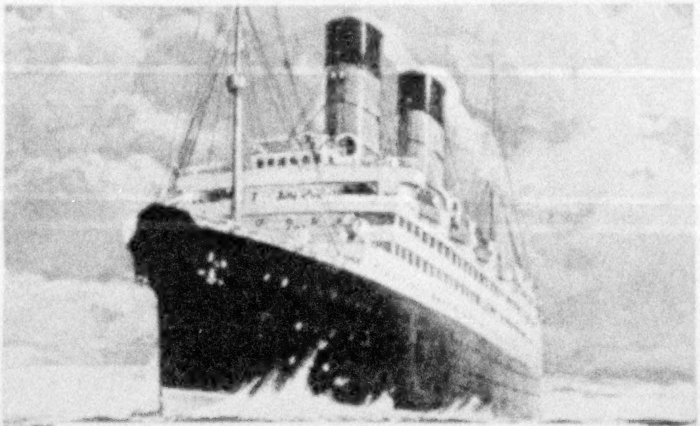
Simply insert your name and address and mail to Dept. B-1598, Palmolive, 3702 Iron St., Chicago, Ill.

Residents of Wisconsin should address Palmolive, Milwaukee, Wis.

. . . .

. . . .

(Please print your name and address)



The largest Cabin Fleet afloat . . . Cunard

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Three Cabin sailings weekly to Europe . . . the solution to an overnight decision to sail . . . and an economical one, too . . . On large, improved, newly decorated Cunarders . . . the result of enormous expenditures . . . justified because Cunard Cabin Crossings have become *the* thing to do . . .

A satisfying . . . inexpensive . . . regular and fast route to England and France . . . And all ships have remodelled and comfortable Tourist Third accommodations . . .

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RATES:

Cabin	$152.50 up
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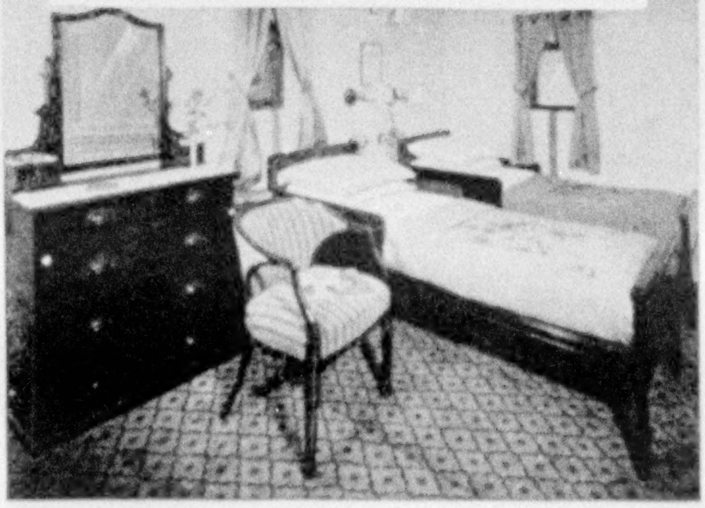
CUNARD LINE

See Your Local Agent

1840 EIGHTY-NINE-YEARS-OF-SERVICE 1929



To the man who is 35 *and* DISSATISFIED

WE DELIBERATELY pass over a large proportion of the readers of the National Geographic in order to address this page directly to men in their thirties.

There is a powerful reason for this.

The dissatisfied man of twenty-five is not usually in a difficult position. He has few responsibilities; he can move easily; he can take a chance.

But from thirty-five to forty is the age of crisis. In these years a man either marks out the course which leads to definite advancement or settles into permanent unhappiness. There are thousands who see the years passing with a feeling close to desperation.

They say:

"I must make more money," but they have no plan for making more.

"I am managing to scrape along now, but how in the world will I ever educate my children?"

To men whose minds are constantly at work on such thoughts, this page is addressed. It is plain, blunt common sense.

Let us get one thing straight at the very start—

We do not want you unless you want us.

There is the dissatisfied man who will do something and the one who won't. We feel sorry for the latter, but we cannot afford to enrol him. We have a reputation for training men who earn large salaries and hold responsible positions. That reputation must be maintained. We can do much, but we cannot make a man succeed who will not help himself.

Now what can happen to a dissatisfied man who acts? We wish we could answer that question by letting you read the letters that come to us in every mail. Here is one, for example—from Victor F. Stine, of Hagerstown, Md.: "I was floundering around without a definite goal," he says, "and was seriously considering Civil Service appointment." (A Civil Service appointment means a few thousand dollars a year for life.)

"The study of your Course and Service was not a hardship," he continues, "rather it was a real pleasure, because it is so practical and inspiring thruout." (The method of the Institute makes it practical and inspiring. You learn executive thinking by meeting executive problems and making executive decisions.) "Added self-confidence and increased vision gained from your Course," says Mr. Stine, "enabled me to accept and discharge added responsibilities successfully."

He is Secretary now of the organization in which he was then a dissatisfied cog.

"Forging Ahead in Business"

For a man like Mr. Stine we can achieve really great results. By learning, thru the Modern Business Course and Service, the necessary fundamental facts of business, he insures his success. His judgment, his value, increase. The closed roads open. The worries disappear.

We attach a coupon to this advertisement. It is a little thing, but our experience proves that it separates out of every hundred readers the few who can act. If you are one of these let us mail you that wonderful little book, "Forging Ahead in Business." For thousands it has turned dissatisfaction into immediate progress.

Announcing Three New Management Courses

The rapid developments in modern business have brought increasing demand for an extension of Institute service to executives.

To meet this demand the Institute now offers three new Management Courses in addition to its regular Modern Business Course and Service. These are a Course and Service in:

1—**Marketing Management**

2—**Production Management**

3—**Finance Management**

These new Courses are of particular interest to younger executives who want definite training in the management of the particular departments of business in which they are now engaged.

The details of this interesting development in business training are included in the booklet which the coupon will bring you. Send for it.

To the ALEXANDER HAMILTON INSTITUTE, 761 Astor Place, New York City.
(In Canada address Alexander Hamilton Institute, Ltd., C. P. R. Bldg., Toronto.)

Send me the new revised edition of "Forging Ahead in Business," which includes a description of the new specialized Management Courses.

Signature ....
Please write plainly

Business Address ....

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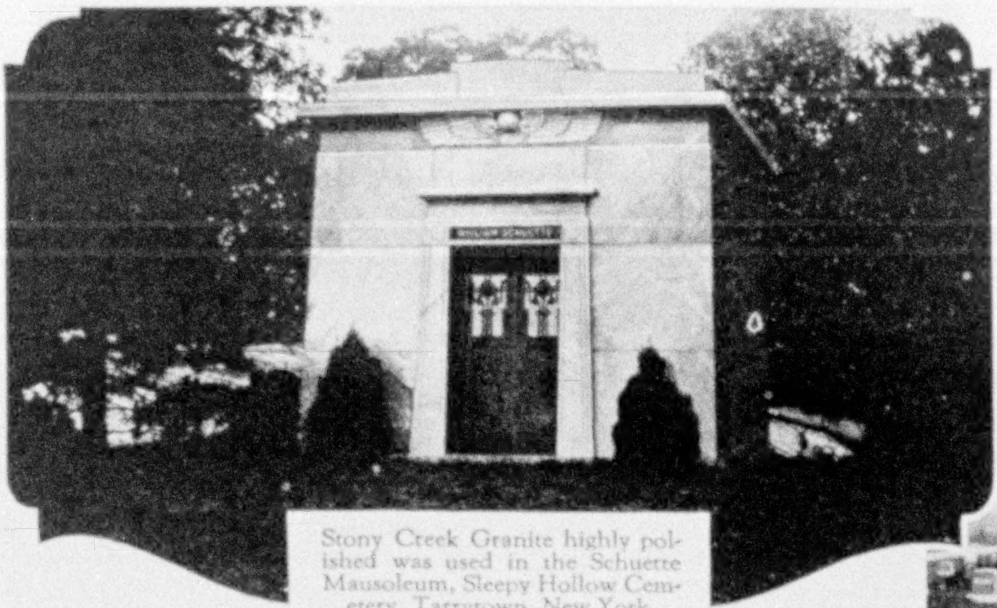
Business Position ....

Modern Business

ALEXANDER HAMILTON INSTITUTE

Executive Training for Business Men



Stony Creek Granite highly polished was used in the Schuette Mausoleum, Sleepy Hollow Cemetery, Tarrytown, New York.

Thompson Memorial, Salt Lake City, Utah, of Victoria White Granite.

THE purchase of a Memorial is not simply of momentary importance, but, rather, it interests you as being in intimate touch for all time with the loving memory of those departed. The finest expression of such devotion may be found in a Dodds-made Memorial, standing unchanged throughout the centuries to come.

Our book, "Modern Memorial Art," should interest you.

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A miniature on porcelain, beautifully colored, 3¼ x 4¼ inches, including a gold-plated frame, regular $35.00, for $12.50

A miniature on ivory, painted by a well-known and reputable miniature painter, regular $250.00, for $150.00

A genuine morocco leather case and gold-plated locket are included in this price. These miniatures can be painted from any suitable photograph, daguerreotype, tintype or snapshot. A moderate charge will be made if original is badly faded or needs restoring. We always quote you the exact cost before proceeding with the work. This is your REAL opportunity to perpetuate in color those who are, or were, dearest and nearest to you.

Please write to Dept. C for a FREE copy of our illustrated booklet, showing miniatures, frames and cases in actual sizes.

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The NATURAL SHORTHAND

—the only scientific system written with pencil or on typewriter. Adopted by leading business concerns. Originated by Miss Emma B. Dearborn, who has taught almost all systems for eighteen years in such institutions as Columbia University, Rochester Business Institute, Simmons College, and the University of California.

FULL DETAILS FREE—Let us tell you about Speedwriting, the Natural Shorthand, and how you can learn quickly at home. Send coupon today.

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GENTLEMEN: Without obligation please send me your Free Book, "Speedwriting," and full details about this new, natural shorthand.

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Weather Will NEVER Wear Them Out

Colorful, substantial J-M Asbestos Shingles provide for this home a roof in keeping with its charm.

J-M ASBESTOS SHINGLES ARE EVERLASTING AND ECONOMICAL

Attractive home of Geo. E. Smith, at Great Neck Estates, Long Island, N. Y. Its architect—W. Albert Swasey. Roofed with J-M Asbestos Shingles.

YOU can truthfully call your roof everlasting if it is made of Johns-Manville Rigid Asbestos Shingles. Unburnable Asbestos and Portland Cement are blended under terrific pressure into rigid monolithic stone shingles.

These sturdy Shingles can never wear out—they never burn, rot, rust or warp, and their beautiful colors are as lasting as Asbestos itself.

Tests Prove Age Adds Strength

The only effect of weather on J-M Asbestos Shingles is to make them harder and stronger. Actual tests such as those recently made by the Southern Testing Laboratories at Jacksonville, Florida, prove that 16-year-old J-M Asbestos Shingles are actually 10% stronger today than when they were laid on the roof!

Fireproof Beauty for All Time

The *right* roof in color, texture and design will add enduring charm to any home. The *wrong* roof mars its beauty and decreases its value.

The wide range of colors, styles and textures offered by J-M Asbestos Shingles have been designed under the direction of a committee of prominent architects to insure an amazing number of color combinations, all in good taste, to meet the diverse demands of any type of house and every budget.

Write for a Free Estimate

Let us show you how little it will cost to roof your house for the last time with J-M Asbestos Shingles. Just fill out the coupon and mail it to the nearest office listed below—our local representative will gladly make a free inspection of your roof and furnish a free estimate to you *without* obligation.

Send for the New Book of Roofs—in it you will find the *right* roof for *your* home.

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☐ Give me a free roof inspection and estimate.

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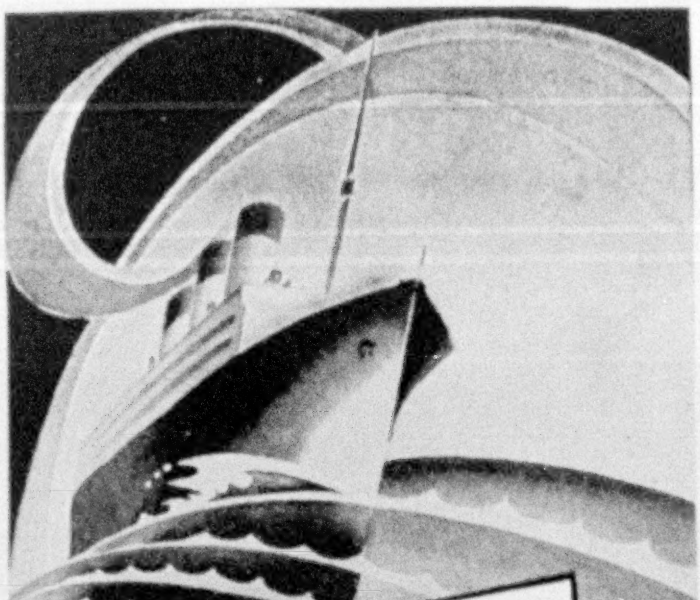

EUROPE

Early Spring Offers

sailings direct to Mediterranean ports Mar. 16, Apr. 6, 20, May 11, 18, 25; itineraries include motoring through Morocco, Algeria and Tunisia; through Sicily, Italy, the Riviera; through Spain to the Ibero-American Exposition at Seville and the Exposition at Barcelona.

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Tours de luxe, by highest class steamers; sailings via North Atlantic and Southern routes. Itineraries covering Great Britain . . . Continental Europe . . . North Cape . . . Russia.

Special Cruise Tours by Airplane; General Airplane and Private Automobile Travel.

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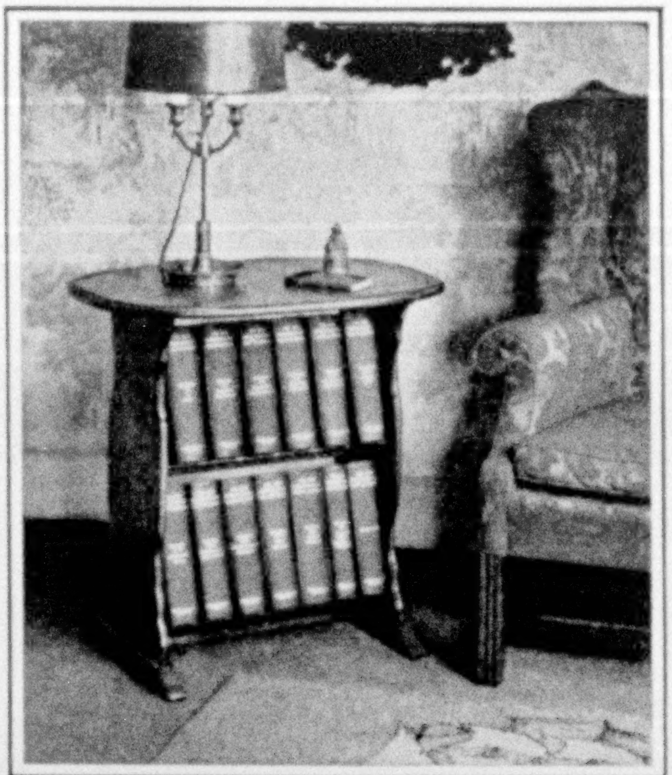

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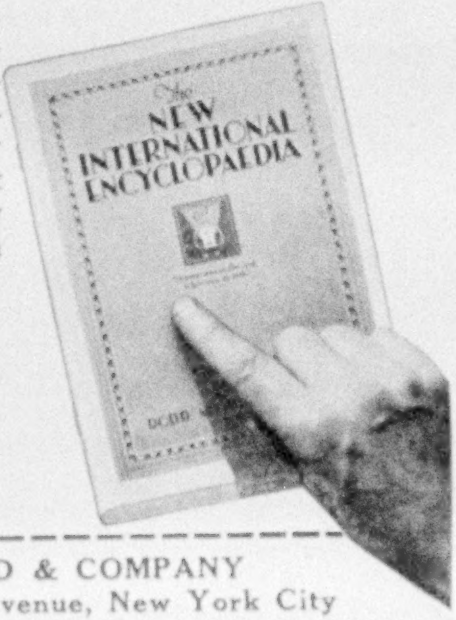

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Wash Wounds *with soap and water*

When an accident happens, the cut whether shallow or deep should be washed clean as quickly as possible. Put enough soap into boiling water to make the water sudsy. When the water cools sufficiently wash out the wound with a sterilized gauze-pad or cloth. Cover with sterilized gauze.

NO wound is so slight that it may not become infected and cause death.

If a wound which breaks the skin is not promptly and correctly treated, there may be immediate infection from germs that are found anywhere and everywhere—streptococcus, staphylococcus and saprophytes.

It should be assumed that all accidental wounds may be infected.

During the World War medical science discovered that by using pure soap and boiled water, fresh wounds, big and little, could be thoroughly cleansed, thereby reducing to a minimum the danger of infection. In other words, the germs were literally washed out of wounds.

Small wounds, immediately cleansed and properly covered with sterilized gauze will, as a rule, heal very promptly without further treatment. But if germs are covered over and bound into wounds, or are sealed in by drawing the skin together, infection is almost certain and serious complications may result.

In applying soapy water to a new wound, it is best to use a pad of sterilized gauze. Any pure soap will do—liquid, soft or hard—but a liquid soap as free from alkali as may be obtained is best. Otherwise the wound may sting or smart. But the slight temporary discomfort caused by a liberal application of soap and water is of little consequence when compared with the protection afforded by a thorough cleansing.

Common sense must determine how long a fresh wound should be washed. But remember always, the washing must be *thorough* so that the soap bubbles may do their part and lift the germs away from the flesh. The water carries the germs away. The wound must be clean before healing begins.

Warm water that has been sterilized by boiling is safest and the utmost care should be taken to keep the fingers from coming in contact with the surface of the wound.

Wash big or little wounds with soap and water at once—as a First Aid before the doctor comes.

According to the latest available United States Census figures, septicemia (blood poisoning) was the direct cause of 1,178 deaths in the year 1925; and a contributing cause in more than seven times as many deaths.

The Metropolitan Life Insurance Company will be glad to mail to each family one copy of its booklet, "First Aid in the Home". It tells how to sterilize cotton or linen cloth when sterilized gauze is not available and gives many other valuable First Aid directions. Ask for Booklet No. 29-N. It will be mailed without charge.

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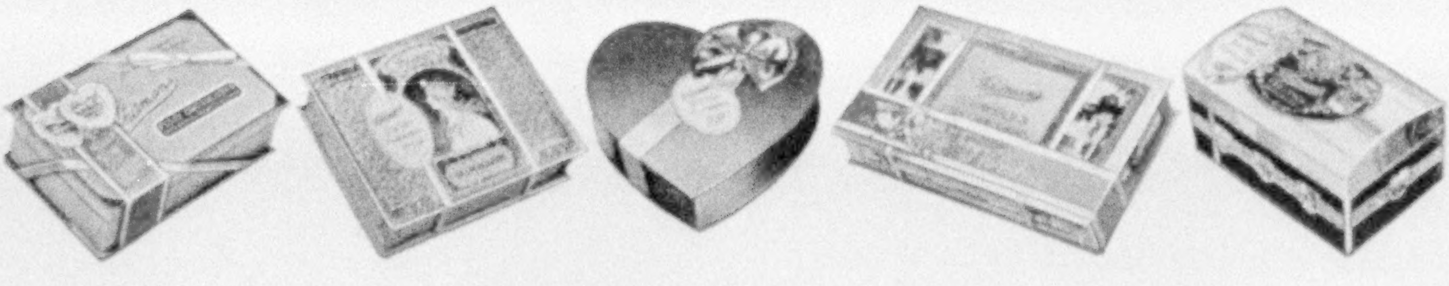

Vol. LV, No. 2 WASHINGTON February, 1929

THE NATIONAL GEOGRAPHIC MAGAZINE

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BUENOS AIRES TO WASHINGTON BY HORSE

A Solitary Journey of Two and a Half Years, Through Eleven American Republics, Covers 9,600 Miles of Mountain and Plain, Desert and Jungle

By A. F. Tschiffely

With Illustrations from Photographs by the Author

I RODE a horse 9,600 miles in two and a half years. From Argentina I came north, over cold, barren, 16,000-foot ranges; then down into steamy jungles, across the Isthmus of Panama, up through Central America and Mexico, and so to the United States.

I reached Washington with the same two horses with which I started—ponies that were 15 and 16 years old when my ride began.

Remote from cities and seaports—far from white men's haunts—ran much of my lonely trail. One night camp might be pitched far from any human habitation; again, I ate and slept with ancient Indian tribes in stone villages older than the Incas.

Of high adventures, hairbreadth escapes, and deeds of daring, there were few; yet in all the annals of exploration I doubt if any traveler, not excepting Marco Polo himself, had more leisure than I to see and understand the people, the animals and plant life of the countries traversed.

THE TRIP WAS UNDERTAKEN TO PROVE THE METTLE OF HORSES

Many persons ask why I undertook the ride from Buenos Aires to Washington. So I should, perhaps, explain just how the project originated.

Now, I am not a *gaucho*, as cowboys of the pampas are called. By profession I am a teacher, having held positions as such in England and in Argentina. To explain the chief reason why I made this long and difficult ride, I must give a brief history of the Argentine *criollo*, or native horse.

In the year 1535 Pedro de Mendoza, founder of Buenos Aires, brought to Argentina a large number of purebred Arabian horses. Later, especially during Indian disturbances, many such animals were turned loose or escaped. In time they increased greatly in numbers and spread not only over the pampas, but down to that southern region of the continent called Patagonia.

Before the Spaniards came, there were no horses, as we now know the animal, in any parts of the North or South American continents; but from the animals introduced by Mendoza a vigorous breed developed. Left to nature and having to resist climatic extremes, hunger and thirst, and attacks by both Indians and wild beasts, it became a survival of the fittest horses. In consequence, weaker foals were

Photograph by De Cou from Galloway

ARGENTINA'S STATELY CAPITOL BUILDING, BUENOS AIRES

Since 1906 the Senate and Chamber of Deputies have held their sessions here. This is only one of many handsome public buildings in the Argentine capital, which is preëminently a city of wealth and pleasure. Rich landowners have built palatial homes here in order to enjoy its cosmopolitan attractions, and when the centenary of the Republic's independence was celebrated, in 1910, many countries presented Argentina with magnificent commemorative statuary.

Photograph from Ewing Galloway

IN FINANCE AND COMMERCE BUENOS AIRES IS SOUTH AMERICA'S NEW YORK

For generations regulations were in force which prevented direct commerce between the capital and Spain. Goods had to be sent overland across the Andes, through Bolivia and Peru, thence by vessel to Panama, and transferred across the Isthmus. Not until independence was attained did Buenos Aires come into its own as a shipping metropolis. The numerous docks, basins, and warehouses border two rivers—one the wide Rio de la Plata, the other a small stream, the Riachuelo. Industries are confined largely to port activities and trading (see, also, "Buenos Aires and Its River of Silver," in the NATIONAL GEOGRAPHIC MAGAZINE for October, 1921). In the middle background is the new Post Office.

Photograph by De Cou from Galloway

MODERN COALING DEVICES EMPLOYED IN THE BUSY HARBOR OF BUENOS AIRES, THE LARGEST CITY IN THE SOUTHERN HEMISPHERE

eliminated and only the strongest and most resistant were able to live and breed.

It is to the criollo horses that the southern republics of South America owe their independence, for they carried the liberators from one distant point to another, over the mighty Andes and through the desolate regions, far into Bolivia and Peru. Without them the political geography and history of that continent might be very different to-day.

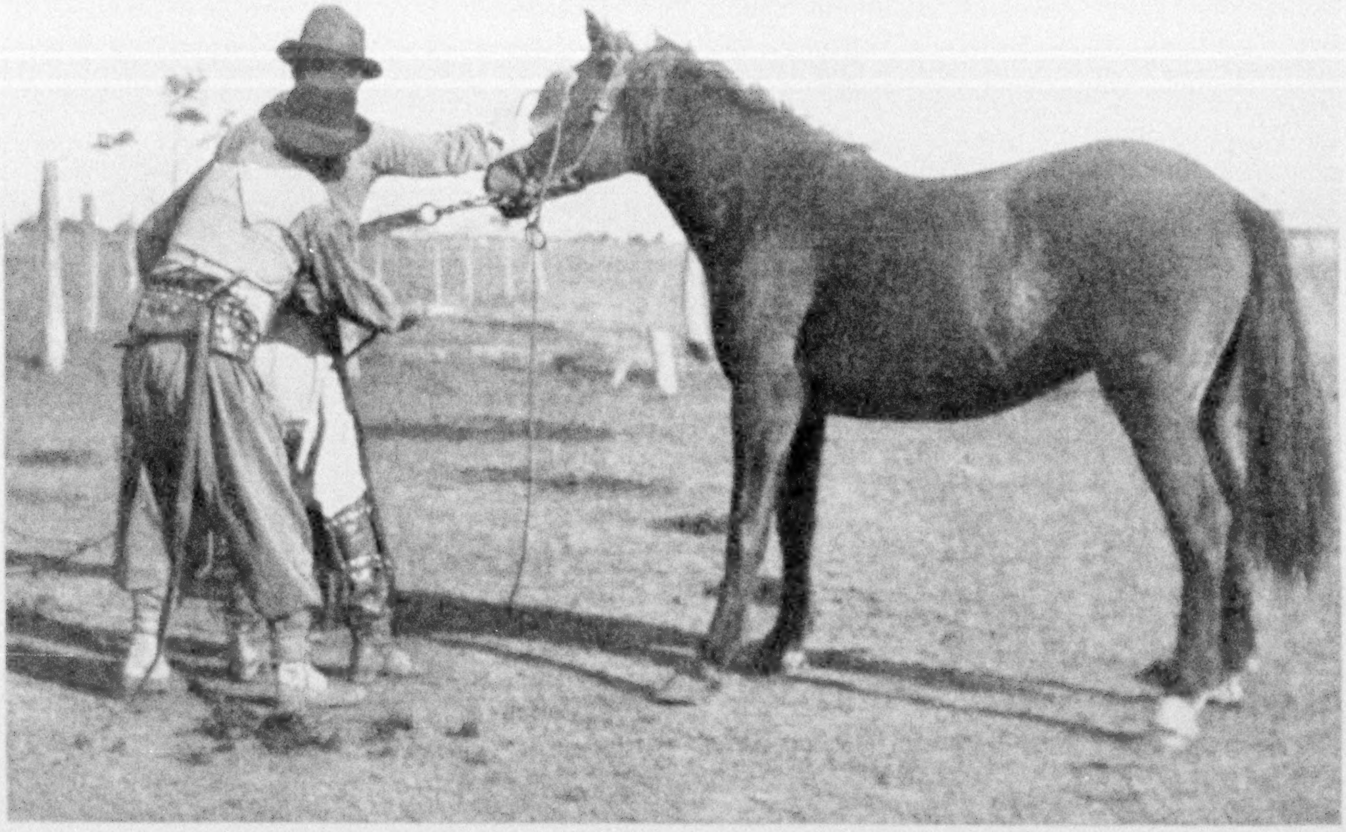
A HARDY, STOCKY, AGILE ANIMAL

The criollo horse is not big. He stands only between 13½ and 14½ hands high. His chest is deep; his legs are stocky, and he is well muscled, hardy, and remarkably agile. But with the introduction of the English race horse and others into Argentina, and the consequent crossbreeding, the original criollo became scarce, being crowded out of the big cities and off the ranches.

So the famous riding exploits by pioneers and soldiers in the early days of Argentina, when the criollo pony was popular, came to be looked upon as fables and legendary feats, handed down from father to son beside the ranchhouse fireplace.

It was to find out for myself whether the criollo horse was ever really capable of the amazing feats of endurance claimed for him in Argentine song and story, as when San Martín marched his cavalry over the high Andes, that I undertook this ride. The whole project was absurd and impossible, my friends insisted; but I went ahead with my plans.

Where to get horses was my first problem; for, as I say, to-day the criollo is very rare. It was by a stroke of luck that I obtained my two mounts from a friend, a horse lover himself, who had just returned from an expedition into the interior of Patagonia, in southern Argentina, where he had met a Tehuelche Indian chief named Liem-Pichun (I Have Feathers). From him my friend bought 30 pure criollos and brought them back to Buenos Aires.



BLINDFOLDING A WILD ARGENTINE PONY WHICH IS BEING BROKEN TO RIDE

In the Southern Republic colts are broken when they are between two and three years old. The gaucho, in the foreground, wears the customary belt of the pampas, with pockets for money, and his ever-ready knife and *rebenque* (whip). The author's mounts for his ride from Buenos Aires to Washington came from the interior of Patagonia (see text, page 138).

From this herd we selected two for my long trip to the United States and broke them to the saddle. This adventure with these wild creatures of the plains was full of fun and excitement. Incidentally, I was thrown clear over a fence and "bought a league of land," as they say in Argentina when a rider is piled on the ground by his horse.

PREPARATIONS FOR THE TRIP

Even after I had found and broken my horses and bought all my equipment, I was far from ready to start on my 9,600-mile ride. There is no royal road from Buenos Aires to Washington, with bridges and signboards, and friendly inns to shelter the traveler. Here and there, of course, are stretches of good road or trail, and my proposed route ran through many big cities; but for hundreds and hundreds of miles there were torrid deserts, cold, barren ranges, and swamps and jungles.

There were many plans to be made before I could safely start. My route had to be controlled by the map, which an aviator can so often ignore in choosing his course. I had to ask and answer such questions as these:

"Where can I be sure of water and fodder for the horses?

"To what altitude can a horse born on the plains climb with safety?

"Will tropical heat kill the horses; and, if so, how can the worst regions be avoided?

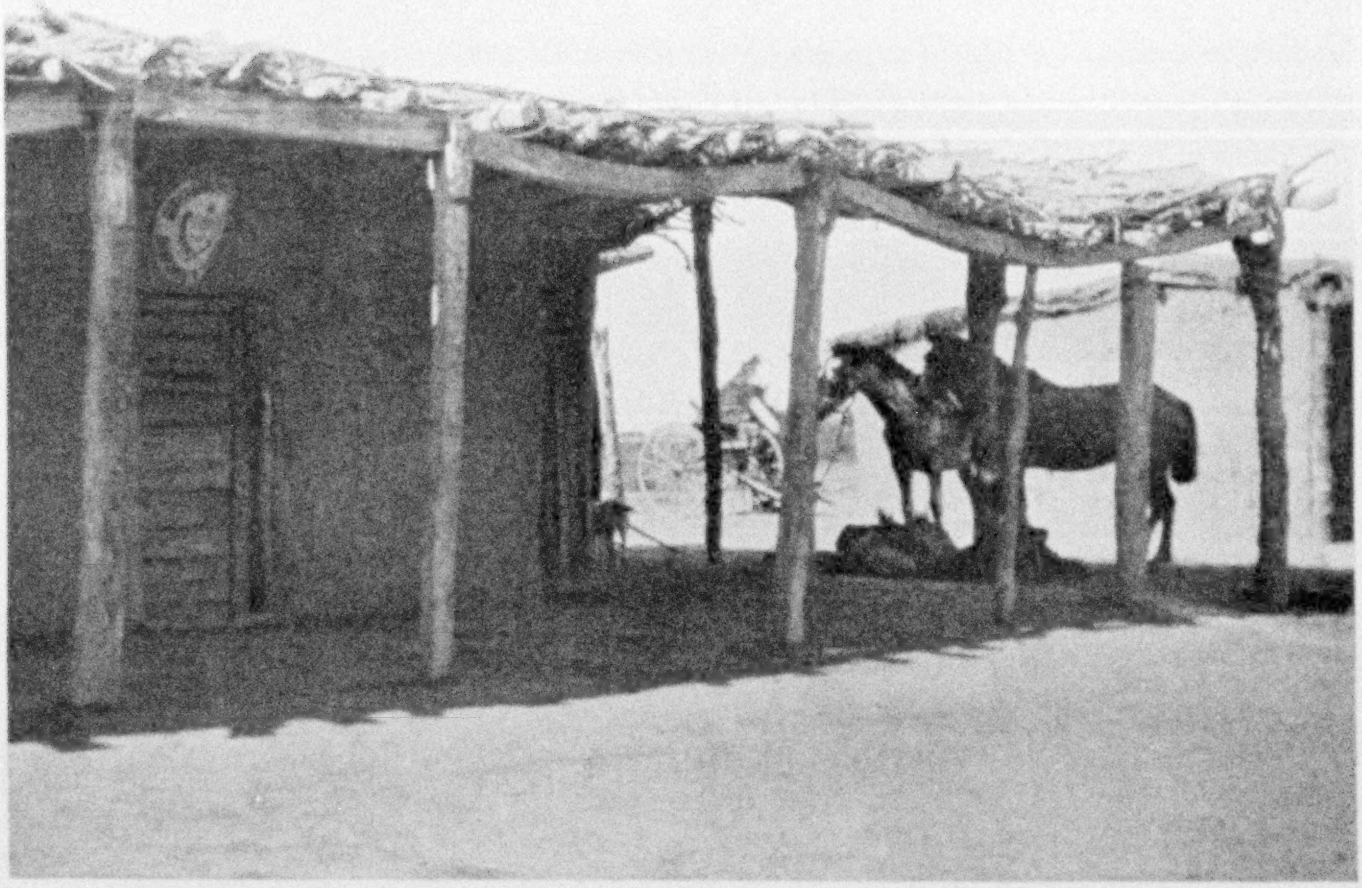
"How can I cross the many big rivers in my path, and at what time of the year are they likely to be in flood?"

Also, equipment had, of course, to be considered. There were saddles, medicines, arms, and other things to buy. No heavy clothing was needed at the start; for it was warm then, and I would ride north toward still warmer countries. Of course, while crossing the highlands and mountains in Bolivia, Peru, and Ecuador, I would need warmer clothing, but I could get that later on. Nor did I need cooking utensils at the start, for the first regions on my march were rather densely inhabited and I could buy food. Cooking

Drawn by A. H. Bumstead

THE AUTHOR'S ROUTE ON HIS 9,600-MILE HORSEBACK JOURNEY FROM BUENOS AIRES TO WASHINGTON: INSERT MAP OF CENTRAL CHILE (SEE PAGES 197-247)

In his message to Congress on December 4, 1928, President Coolidge emphasized the importance of inter-American highways. "We should provide our southern neighbors, if they request it, with engineer advisers for the construction of roads and bridges," he said. . . . "Assistance should be given especially to any project for a highway designed to connect all the countries on this hemisphere and thus facilitate intercourse and closer relations among them."



A COUNTRY POLICE STATION IN THE PROVINCE OF SANTIAGO DEL ESTERO, ARGENTINA

The buildings are constructed of quebracho poles, covered with reeds and mud. The author's horses are tied under the shed.

utensils, when I used them later, were most primitive; I had one pot for coffee and one for meat and beans.

THE JOURNEY BEGINS

On April 23, 1925, all plans made, I swung into the saddle and pointed my horses' noses toward the United States. Here began a journey that was to carry me through 11 different republics and was to consume nearly 900 days.

Both of my horses were named after their colors. One, a pinto, called Manchado (Stained) in Argentina, had his name shortened to Mancha. The other, a dark buckskin, was Gateado (Cat-colored)—in Argentina shortened to Gato (Cat).

I started alone. I enjoy the companionship of my fellow man, but I knew that on such a long, rough, and trying trip as lay ahead even the most congenial travelers would inevitably develop differences of opinion. Furthermore, I knew that in many regions it would be very hard to find fodder for my two horses, and that it would be just twice as hard to find fodder for two more. I took a police dog for company, but the second day out from Buenos Aires one of my horses kicked him and broke his shoulder. I had to send him back and go it alone.

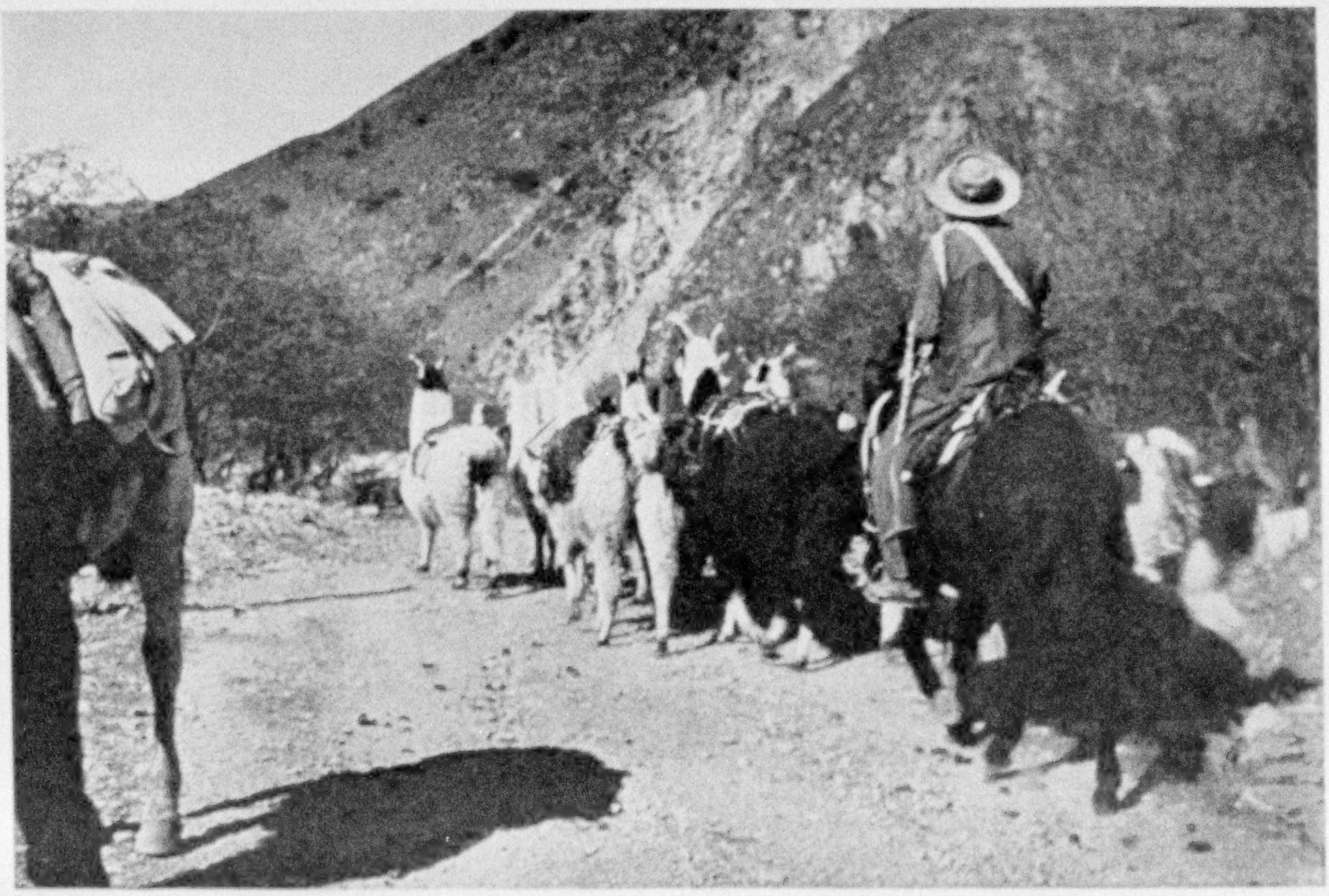
I rode one horse and carried my pack on the other. At first I had to lead the pack horse; later, when we came to be friends, halter ropes were discarded and we all stuck together. On the first stage of my ride the pack horse had little to carry, aside from a few clothes, some photographic material, and one or two books. Most of the way my literary companion was "Pickwick Papers."

Until I reached the Bolivian border I carried only a .45-caliber revolver. Later, I got a 12-gauge shotgun to shoot birds for food. On the whole trip I shot no bird or animal for pleasure. I did kill a number of crocodiles and alligators; to me they are worse enemies than snakes. The snake seldom attacks unless it is disturbed. This is not true of alligators.

The first few days of the journey from Buenos Aires to Rosario were easy enough, except that steady rains had left the dirt road soft and muddy. As yet Argentina has few fine highways, such as

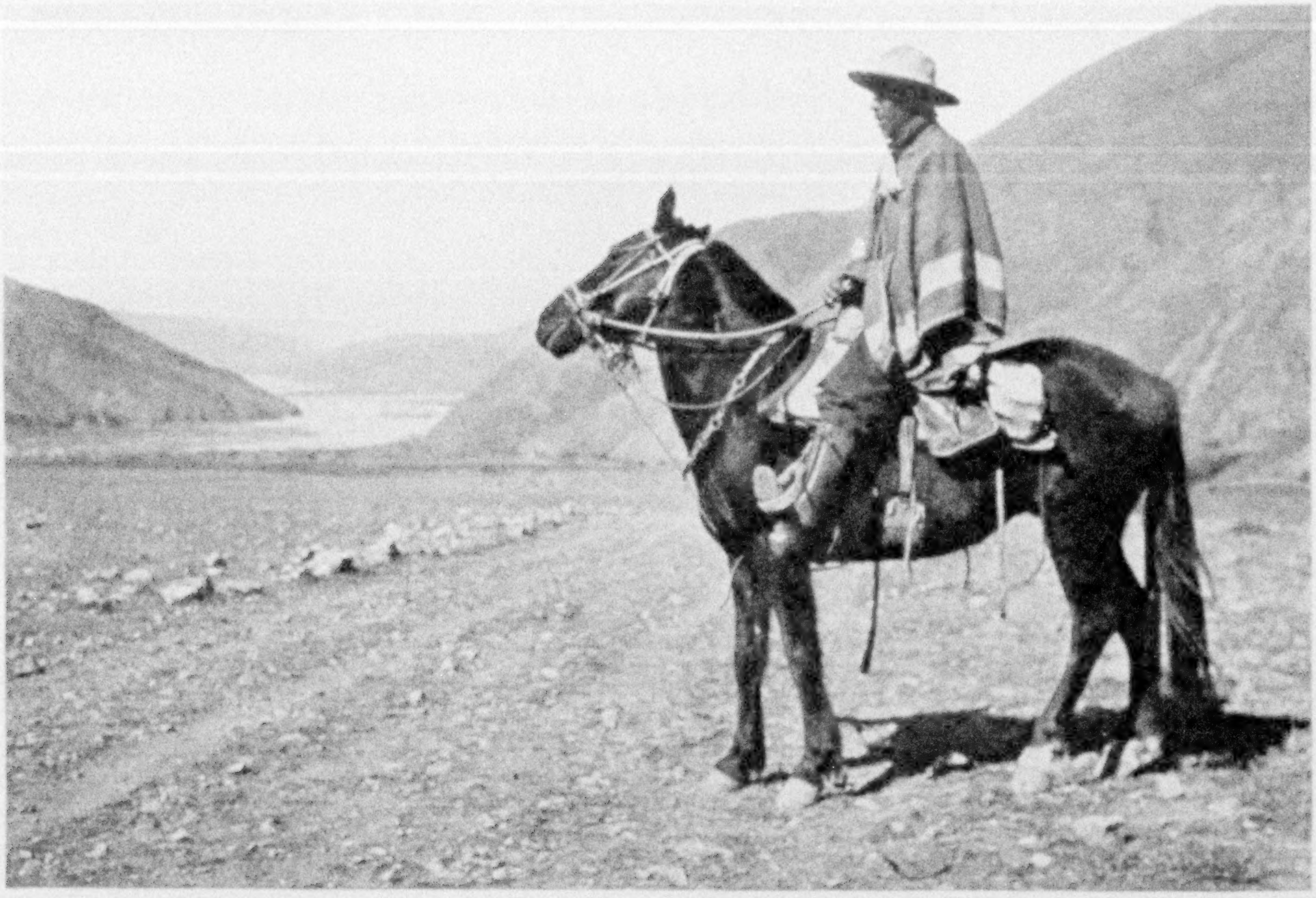
UNCOUNTED CENTURIES AGO A CIVILIZATION FLOURISHED IN NORTHERN ARGENTINA

Here a guide holds a skull unearthed from the ruins of Tilcara, which existed before the days of the Incas. Near by is a vast crater, which, according to natives, was bored by a fiery rock from another world (see, also, text, page 145).



THE LLAMA IS THE PACK ANIMAL OF THE ANDES

The South American mountain Indian who owns from ten to fifty llamas adds to his scant income by weaving llama wool and making pottery. About once a year he drives his pack down to the valley towns to trade. A llama train in northern Argentina (see text, page 145).



A PEASANT RIDES TRAIL THROUGH THE ARGENTINE VALLEY OF HUMAHUACA

Humahuaca means "Crying Head." Legend relates that here a lover was beheaded by his sweetheart's father, who opposed the match, and that after death the severed head continued to shed tears.

those in the United States; after heavy rains, automobiles and even horse-drawn vehicles are often in trouble.

Throughout this part of Argentina food was easy to find in the many settlements. The climate is temperate and healthful and the land is covered with farms and cow ranches.

Heavy rain held me 12 days in Rosario. With clearing weather I pushed on toward the northwest. Here was a prairie land with monotonous roadways, straight as an arrow and reaching to far horizons; long lines of wire fence to right and left across a country flat as a billiard table, its sky-line broken now and then by a ranchhouse, a tall steel windmill tower, or a solitary ombu, or elephant tree. Seas of corn, wheat, and oats, vast herds of fine fat cattle—a land of milk and honey, yet, to a horseback rider, tiresome in its sameness.

Two hundred miles of this, and then the great salt beds of Santiago del Estero. Here everything changed. Coarse shrubs and tall cactus took the place of wheat and corn.

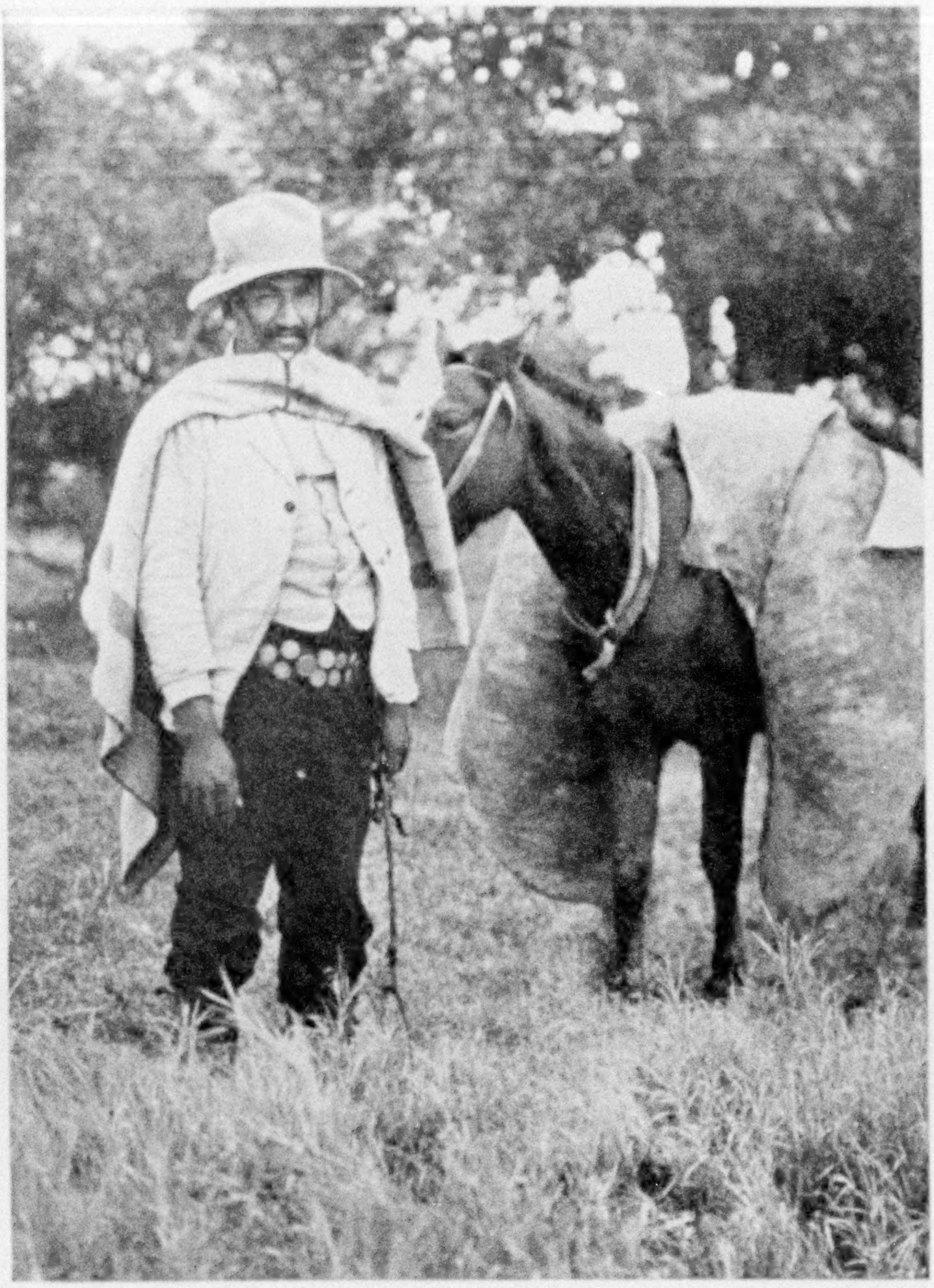
Here we met with fresh difficulty. I say "we," meaning the horses and me. Among Argentinians one man riding a horse is "I"; accompanied by two or more horses, the group is "we."

In these salt beds our road became merely a wide and dusty trail. The water we found very salty and even the coarse grass and shrub had a strong salty taste. The ground was so white with salt that it looked as if snow had fallen. Here we saw few people, but many goats.

The inhabitants had dark complexions, were obviously very poor, and lived in small mud huts without windows. A railroad crosses this wretched region; its stations are few and far between, but at least they furnished me fresh water, which is hauled in by train for the use of the few resident employees. This water is so precious that they put it in cisterns which are secured by padlocks, to prevent its theft.

THE FIRST DIFFICULT STAGE OF THE JOURNEY IS COMPLETED

Ten long days' riding saw us safely out of this desolation and happily at the gates



LEATHER WINGS PROTECT HORSE AND RIDER FROM BRUSH AND THORNS

Galloping horses resemble huge butterflies in these flapping shrubbery guards. Sometimes an additional large piece of leather is put across the horse's breast as further protection. This rider, from near Tucumán, Argentina, is not a *gaucho*, but a mountain man. His belt is made of coins.

of "the Eden of Argentina," as the beautiful country around Tucumán is often called. Here green sugar-cane fields and sparkling streams greeted us; beyond distant hills rose the first range of the mighty Andes, glittering in brilliant sunshine. Though my face was terribly burnt with the sun and salty dust of Santiago del Estero, I could now forget my troubles. I was happy and proud. I had successfully crossed a region which experienced horsemen had warned me my animals could never traverse. Now, in the pretty city of Tucumán, we took a well-earned rest.

From this point a steady climb began toward the yet-distant Bolivian border. Our trail grew rough. Sometimes we wound through hills covered with stately forests, or passed huge cactus plants resembling gigantic pillars of some old European cathedral. At times we had to follow river beds as the only paths. Luckily, we arrived at a time of low water; otherwise we would have been forced to abandon the trip or wait for many months. As it was, now and then we had to ford a river at some bad place, and it was easy to realize what these river beds must be like when filled with foaming, roaring waters that rush down toward the Atlantic, carrying with them big rocks, trees, and often even animals.

Cattle roam in these forests, and cowboys wearing leather chaps, with enormous "wings" to protect their legs and the horses' flanks against thorns and bushes, gallop noisily through the woods, rounding up the half-wild animals. Sometimes the cow ponies are also provided with leather guards.

This region abounds in wild game. The pumas and foxes prey on the live stock and poultry of the settlers. Often, as I entered a clearing in the forest, I saw rheas (American ostriches) running away.

North we marched and into a high valley, to Jujuy, a little town of rare beauty. Hereabout were many sugar refineries. The climate seemed ideal. It suggested only perfect health, yet malaria was common, especially among the field workers.

THE ARGENTINE THORN BIRD FORTIFIES HIS NEST AGAINST ENEMIES

Espina is Spanish for thorn, and *espinillo* is the local name given the thorn bird, whose nest is shown here. Despite their formidable appearance, these nests are sometimes seized and occupied by a kind of weasel.

Holding our course steadily northward, we proceeded for many days through a deep river bed and approached the border of Bolivia. Recently a railroad was completed through here, connecting Buenos Aires with La Paz, the capital of Bolivia. But there was no highway; so we were forced to feel our way, mile by mile, over rocks and sharp stones, up this desolate wind-swept valley. Beyond a few cactus bushes, we saw no plant life at all.

Picking our slow, hard way over the stony trails, we met now and then a band of Quichua Indians with their herds of llamas. As we went up, the Indians came down on their way to distant towns. Their llamas carried packs containing pottery and woven goods. In the towns these things would be traded for rock salt and other commodities (see page 142).

Halfway up a valley called the Quebrada of Humahuaca are the prehistoric ruins of Tilcara, standing on a high, steep mountain, overlooking the river far below. Strange and fascinating legends cling to this ancient town of the dead. Often treasure hunters have disturbed its slumbers in their arduous quests. Long ago, when the people of Tilcara buried a chief, they covered his face with a golden mask.

ANCIENT GRAVE ALMOST CAUSES DISASTER

I wished if possible to obtain a memento of my visit, so I took a guide, climbed far up the steep trail to the ancient ruins, and looked for graves.

Most of the natives hereabout are very superstitious. They will not go near the "dead towns," as they call the ruins; they say that disaster or death may overtake anyone who meddles with ancient graves. With them the fear of such misfortunes is usually above the lure of lost treasures.

But my guide was an exception. He located the graves by stamping on the ground. If it sounded hollow, he would bore into the sandy soil with a thin steel rod about five feet long. In this way we found several graves, shaped like old-fashioned straw beehives. The dead were buried doubled up, in a sitting position.

THE CLEVER OVEN BIRD OF ARGENTINA BUILDS A SECURE HOME

One *hornero's* nest is just like another, all being entered by a crooked labyrinth through which no hand can be passed.

The graves usually contained a few pots, probably filled with food and coca leaves when buried with the dead man. We also found tools and drinking cups in the tombs (see, also, page 142).

One big grave held the bones of a llama, possibly a sacred animal, for it is believed that in olden days white llamas were worshiped.

In one of these graves, as I was scraping the sand away, I stuck an old thorn in my right hand. The next day blood poison set in. Soon my left hand and face were affected; then my right leg. The credulous Indians, of course, might well have said, "I told you so." There were no doctors, as we know them, within 120 miles—120 miles of terrible trails. Yet there was no alternative for me but to saddle up and make the fight. In pain and misery we passed Tres Cruces, 11,000 feet above sea level—cold, desolate, and wind-swept, surrounded by endless mountain chains.

Among dirty Indians I slept on the floors of little stone huts at night. Fodder for the horses hardly existed. I could only tie them to a rock and leave them out in the cold. I could not turn them loose because hereabout were poisonous weeds.

After six days of scrambling, stumbling, and falling over one of the worst trails imaginable, we finally arrived at the border town of La Quiaca.

Miserable as it is, it seemed a paradise to me then. Although I received medical treatment, my condition did not improve. The physician advised me to return to Buenos Aires at once. This I did not wish to do. I feared ridicule, or that people might think my illness a mere pretext for quitting the journey before striking the main ranges of the Andes. So, after a delay of four weeks, during which time my condition showed little improvement, I made up my mind to push on and trust to Providence.

I provided myself with guns, ammunition, suitable clothing, and equipment for the next stage of the trip. When I was ready I packed up and mounted, hoping for the best, but expecting the worst. Mountain sickness added to my discomfort. For a few days I bled much at the nose. My right leg was so swollen that I had to discard my boot and wear only a

bandage, a thick woolen sock and a sandal. In this condition we pushed on.

CROSSES ARE OFTEN ERECTED AT WAYSIDE SPOTS WHERE TRAVELERS HAVE DIED

On this big cross in northern Argentina hangs a small tin pail, wherein charitable wayfaring men may drop coins. Then, when men in distress appear, they may take such coins as they need. No one else molests this money, so it may remain for long periods undisturbed.

AN INDIAN HERB DOCTOR EFFECTS A CURE

In a mountain village I heard of an Indian *curandero,* or herb doctor, of local fame. I sent for him. Through an interpreter, he asked me many intelligent questions about my habits and general health. I answered these, and he started dosing me with medicines made out of herbs. In five days the swelling in my leg went down. My fever left me and the sore places on my foot dried up with amazing quickness. For his "professional service" the Indian charged me the equivalent of thirty cents in American money. When I gave him five times that much and a handful of coca leaves he was overwhelmed with surprise and gratitude.

I remained in the herb doctor's village no longer than necessary. There was nothing to do all day but watch the Indians weave cloth or come and go from their little corn patches that cling to the mountain side. They cooked their food in earthen pots and served it in wooden bowls that were rarely washed.

One of the questions most frequently put to me about this trip has to do with the effect of high elevations on men and horses. I might say here that in the higher altitudes, especially in Bolivia and northern Argentina, mountain sickness is a great danger to both men and horses. Natives in some regions call this ailment *puna;* in other parts they call it *soroche.*

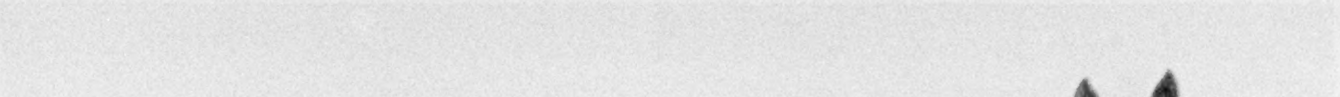
In very high regions I dismounted and went on foot up any steep slope. The horses followed me. I reasoned that by climbing on foot I would naturally feel the lack of air pressure and would stop when out of breath, whereas had I stayed on the horse's back I might have failed to realize how hard he was laboring for breath in the rare atmosphere and so might have killed him.

A DRASTIC REMEDY FOR MOUNTAIN SICKNESS

Both horses and mules can be easily affected by mountain sickness. When an animal drops with an attack, the best

BOLIVIAN INDIANS WEAVE THESE BOATS OF RUSHES

Known as *balsas*, these skiffs are much used on Lake Titicaca. Indian fishermen landing with their day's catch.

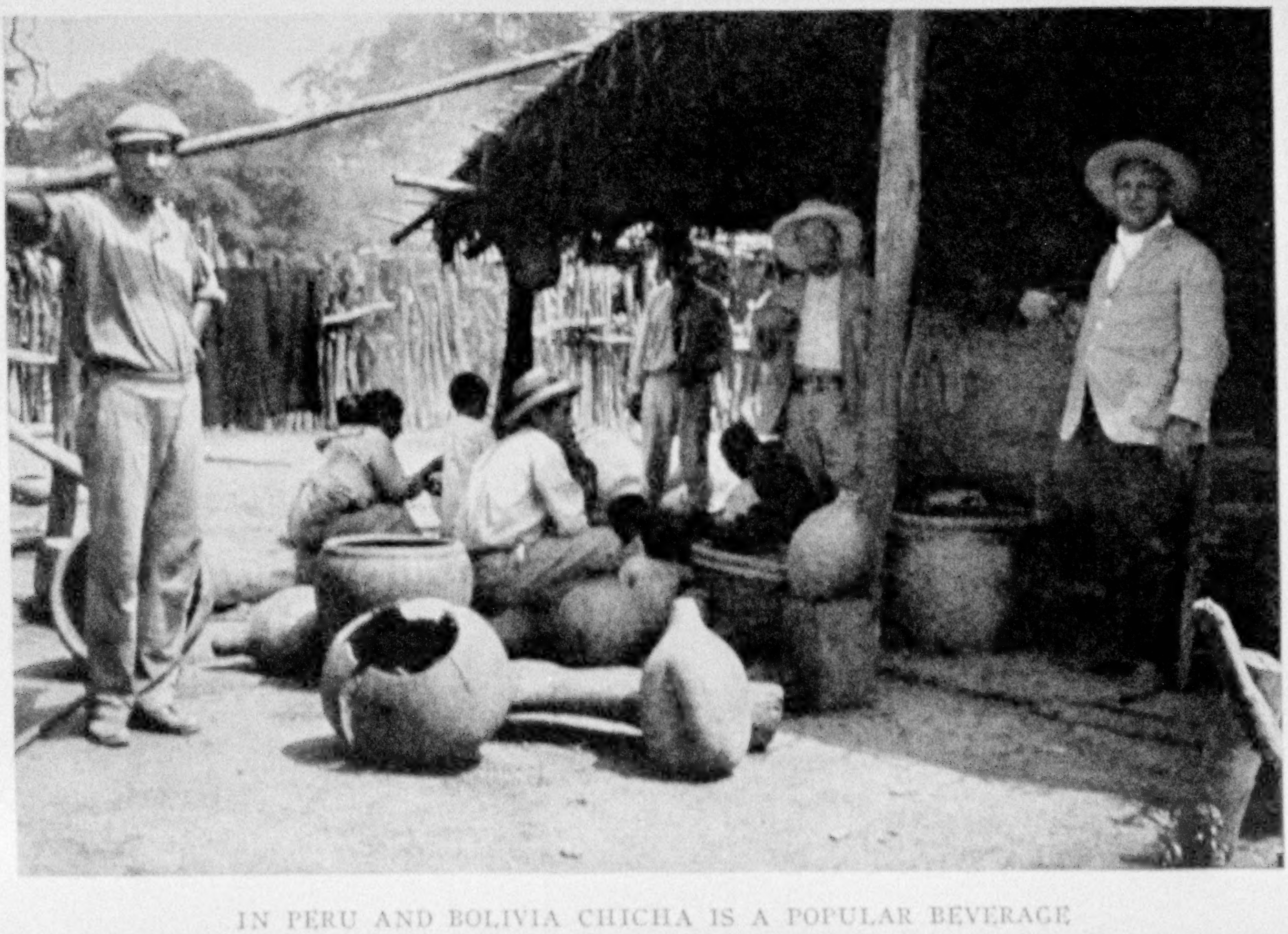


GATO AND MANCHA ON THE SHORES OF LAKE TITICACA

In this highest navigable lake of fresh water there grows a kind of weed, which Indians gather for their cattle. On the Island of the Moon, in this lake, stand ruined temples.

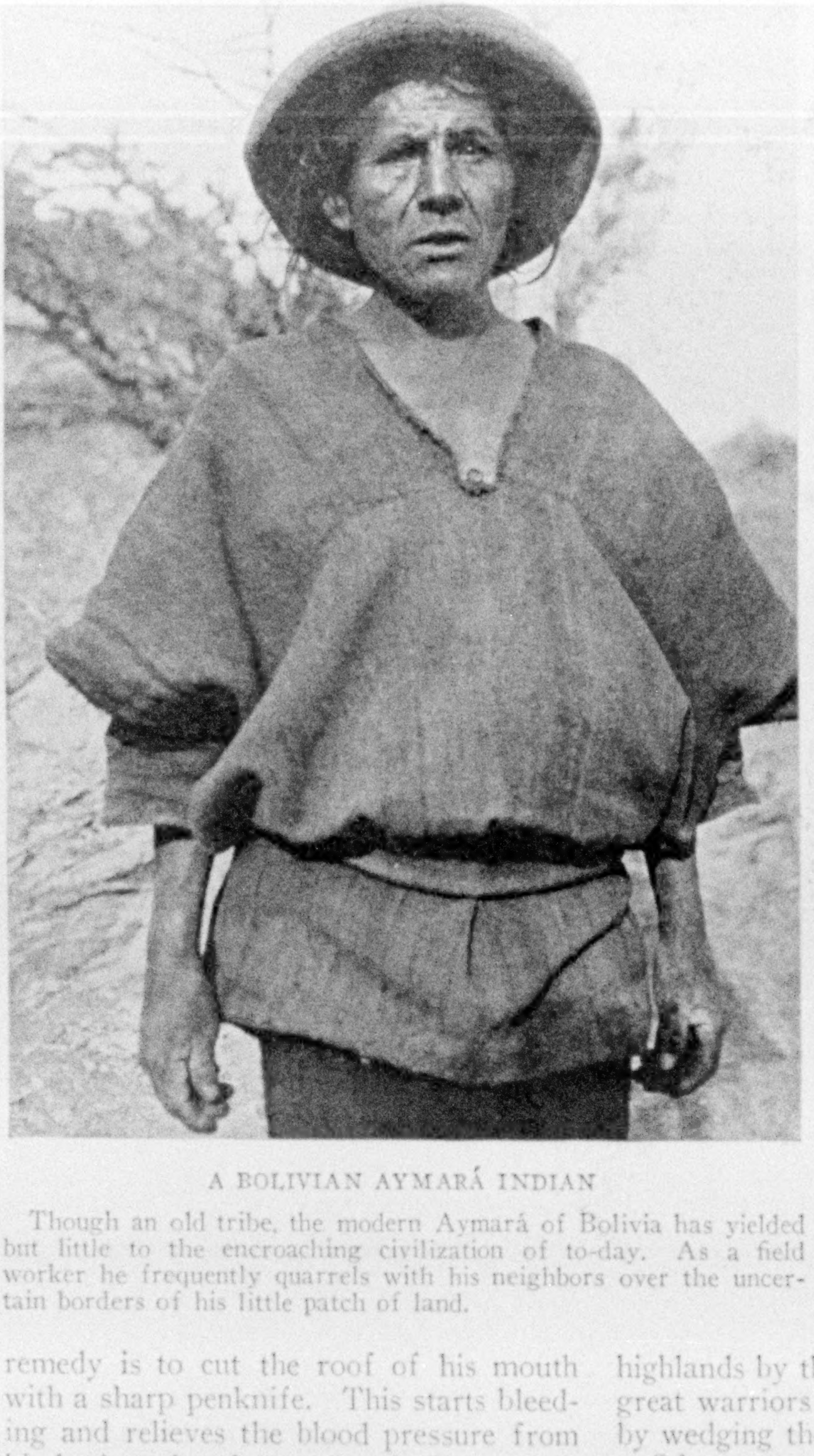
AN OPEN-AIR WEDDING BALL NEAR LAKE TITICACA

The women merrymakers spin about like tops, to reveal their various petticoats of many colors. These are hill-dwelling Indians in town for a wedding fiesta.



IN PERU AND BOLIVIA CHICHA IS A POPULAR BEVERAGE

The brownish drink is made from fermented corn. Ollas and calabashes are used in preparing it.



A BOLIVIAN AYMARÁ INDIAN

Though an old tribe, the modern Aymará of Bolivia has yielded but little to the encroaching civilization of to-day. As a field worker he frequently quarrels with his neighbors over the uncertain borders of his little patch of land.

remedy is to cut the roof of his mouth with a sharp penknife. This starts bleeding and relieves the blood pressure from his brain. Another treatment is to crush garlic between two stones, mix it with pure alcohol, and blow this in the animal's nose. Llamas, as far as I know, never suffer from mountain sickness. Natives often give mules coca leaves to stimulate them. I never had to do this, as my horses did not seem to suffer from the altitude at all, except that they breathed heavily at times after a great effort.

My shortest route from the Indian doctor's home to La Paz would have been to follow the railroad line; but that I could not do, because it runs through the desert regions of Uyuni, where my horses would have starved; so I went on up the valley and over the mountains east of the main range to Potosí, the famous mining town. From districts inhabited by the Quichua Indians, I entered the region inhabited by the Aymarás.* The language of neither people was understandable to me, but I managed to learn a few words of Quichua, enough with which to ask for food and water.

Once these Indian lands were part of the great Inca empire, which stretched from Ecuador to Argentina, or, more properly, from Quito down to Tucumán. In Chile it extended even farther south. I know of no more wonderful and fascinating story of this ancient civilization than that told by Prescott in "The Conquest of Peru."

I found these Indians not hostile, but sullen, particularly the Aymarás. At one time they lived on the coast. Later they were transported to the highlands by the Incas, because they were great warriors and could be subdued only by wedging them between other tribes.

Of course, these Indians have degenerated much since the Conquest. Spanish invaders destroyed their fine systems of irrigation. To this day, on the mountain sides, one sees ruins of plantation terraces and canals† destroyed by the ruthless conqueror in his mad hunt for gold and silver treasure.

*See "The Heart of Aymará Land," by Stewart E. McMillin, in the NATIONAL GEOGRAPHIC MAGAZINE for February, 1927.

†See, also, "Staircase Farms of the Ancients," by O. F. Cook, in the NATIONAL GEOGRAPHIC MAGAZINE for May, 1916.

Nothing grows now in many places where there used to be fields and crops. So it was not always easy for me to find forage for my horses. In fact, often all I could get was barley straw. This grain is the chief food of the Indians, who seem industrious enough; but their methods of work are primitive.

All along the rough and often dizzy trail through this Indian country I saw pits which had been dug by seekers after buried treasure, supposedly hidden by the Spaniards during their retreat south in the war for independence.

AN OLD, OLD MAN OF THE MOUNTAINS

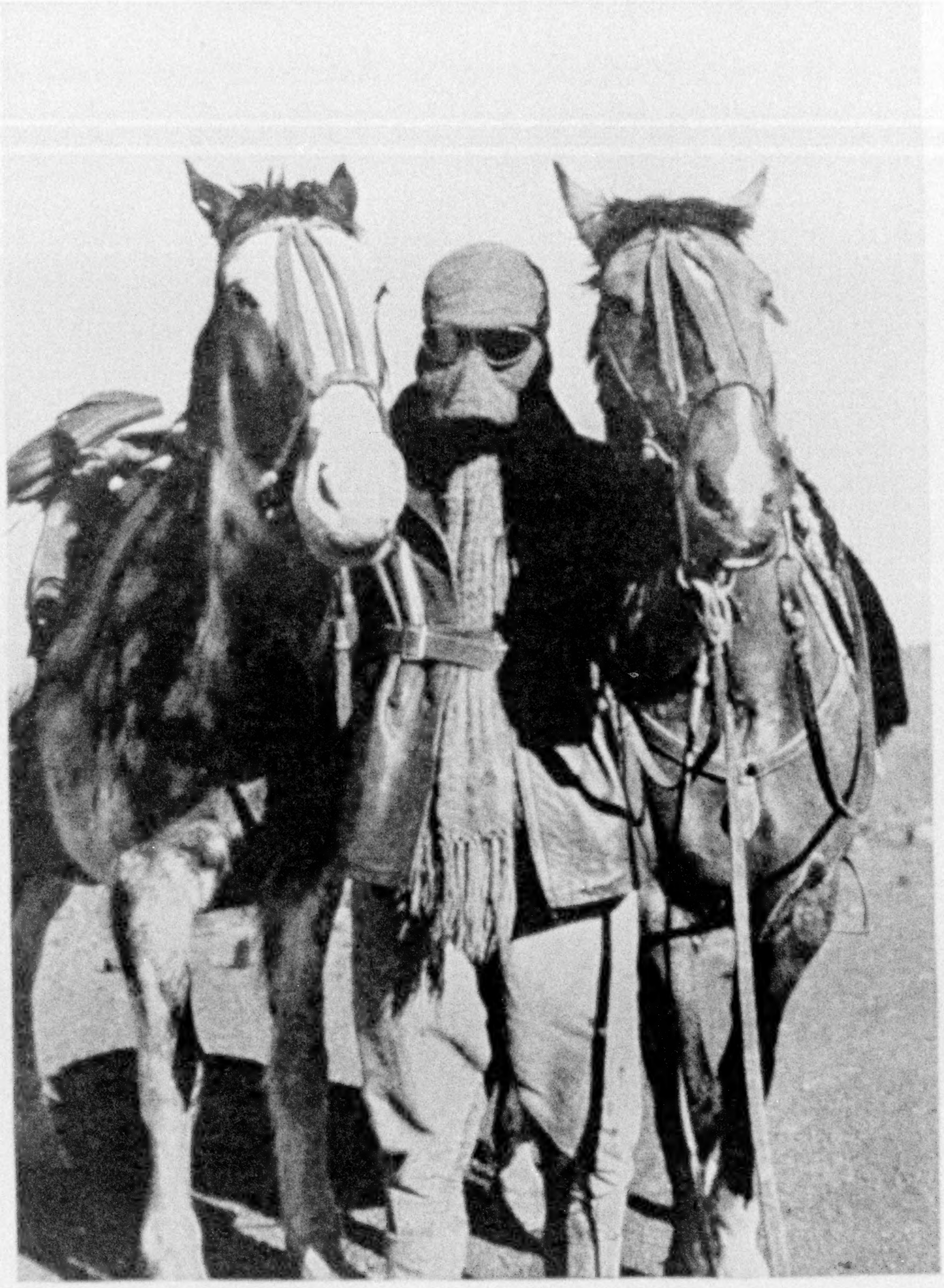
In a stone hut on the Bolivian highlands he lives alone. His 90-year-old youngest son visits him every day or two, bringing food and water. "This 90-year-old son told me he had older brothers," said the author, "so the father must be well past the century mark." Such reputed age is common among these Indians.

POTOSÍ IS ONE OF THE WORLD'S MOST FAMOUS MINING TOWNS

Potosí is one of the most famous silver mining towns in the world. It is situated about 13,000 feet above the sea, at the foot of the fabulously rich Cerro de Potosí. Houses here are of the old Spanish colonial type, with quaint balconies and barred windows. Streets are narrow and plazas are spacious. Here I found a masterpiece of old Spanish wooden machinery in the form of a minting machine (see illustration, page 156). The dies for stamping the money have been carried away. Were they replaced, this crude but stout machine would perhaps run as well to-day as it did when it was made, 350 years ago. There are no nails in it. It is made of hardwood, fastened together with rawhide and wooden pins, its timbers having been carried all the way up from northern Argentina.

From Potosí we crossed the high ranges in a westerly direction to Lake Poopó. Here the trail led over high mountains and through deep ravines. Long ago this was a famous Spanish gold trail. To-day only occasionally Indians use it. Not far from Potosí we crossed over an old bridge called Puente del Diablo (Devil's Bridge). It was built of solid stone by the Spaniards and spans a deep ravine above foaming waters far below (see illustration, page 163).

Late one evening, from a high point, I beheld Lake Poopó, clear in the distance,



THE AUTHOR WEARING A SAND-STORM MASK IN BOLIVIA

Salitre, as the natives call it, or saltpeter, is mixed with sand particles and causes irritation when blown into the eyes. A man's face swells and his lips crack if exposed to the harsh winds. For protection, the natives wear masks.

on a tableland of central Bolivia. The sun was setting and above it multicolored clouds spread out like the tail of a great peacock. It would take a better pen than mine to describe the glories of Andean sunsets.

A DELIGHTFUL REST IN PERU'S CAPITAL

A few long marches put us on the high sandy plains of upper Bolivia. Passing through Oruro to Viacha, we came finally to La Paz. As we approached this capital over the plain, we saw in the east the snow-capped giant Illimani, but the city itself lay hidden in a deep bowl and did not come in view until we reached the edge of a steep incline leading down to it.*

Ours had been a strenuous journey; so for two weeks we rested in La Paz and ate good food. Then over the pack trail to Viacha once more, and on in two days to Lake Titicaca and the ruins of Tiahuanacu. It was easy to march along the shore of Titicaca; but there were no accommodations for travelers. Here and there were posts occupied by police, with whom I usually spent the night, making a bed with my saddle sheepskins on the floor. I could always recognize these police by their caps and the fact that each carried an old European sword.

THE PROBLEM OF FOOD FOR THREE

Food was the vital problem. Often I had to go from house to house until I found some one willing to cook for me, but in the small towns there were Indian squaws who sold food at little stalls in the streets. Now and then I even found a "hotel," the only furniture in the guest room being the wooden frame of a bed. Even when there was a mattress, it was wiser to put it out of the door, sprinkle insect powder on the bed frame, and then use my horse blankets.

Usually, in these villages, I could put up my horses for the night by fastening them in somebody's back yard or corral; but feeding them was not so easy. Horse feed here is scarce and expensive, and apparently a great temptation to thieves.

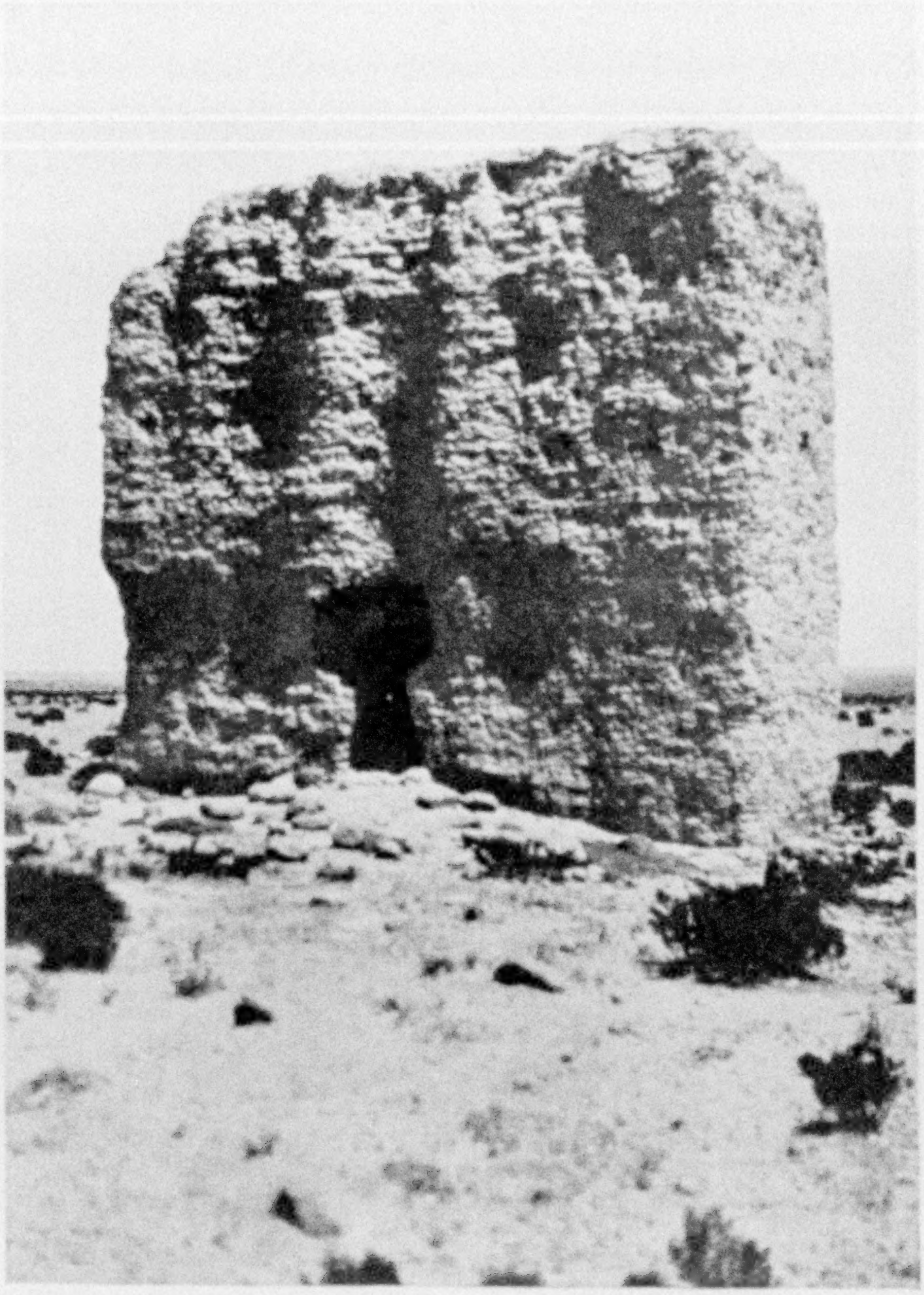
* See, also, "Kaleidoscopic La Paz: The City of the Clouds," by Harriet Chalmers Adams, in the NATIONAL GEOGRAPHIC MAGAZINE for February, 1909.

I soon learned not to give my animals their full allowance at any one time. When I did that, some one stole it. I had an alarm clock with me, which I would set to awake me every two hours. Thus, at regular intervals I would go out and give my horses a bit more fodder, which I scattered well over the ground to make it harder for thieves to pick up.

From Titicaca we followed the railroad line to Cuzco, ancient capital of the old Inca Empire.* About it are many ruins of lost civilization and also some excellent examples of church architecture.

We had now crossed one main range of the Andes, but ahead lay two more to be conquered before we could reach the Pacific coast.

The Andes consist of three main ranges running more or less north and south, but there are minor ranges of equal height that cut across from east to west. The points where these mountain chains cross each other are called *nudos*, or knots.



A PREHISTORIC TOMB ON A HIGH PLATEAU NEAR ORURO, BOLIVIA

Nobody knows now who built this monument, much less the name of him whose memory it sought to perpetuate.

One of the roughest and most tiring mountain stretches I climbed was that between Cuzco and Ayacucho, in Peru. Range after range had to be crossed, and in places the narrow, slippery trails were treacherous and dangerous. Yet these climbs had their compensations. From high up on cold peaks, amazing panoramas spread before me, with summits towering above mist and fog of tropical valleys.

Grand and inspiring as these vistas were, they hardly compensated for the interminable climbs, the painful zigzagging up and up, only to slip and stumble down again for miles into another hot valley, where screeching parrots seemed to protest my invasion and where swarms of gnats and mosquitoes harassed me and my horses.

Going down one such dizzy trail, my pack horse slipped over the edge. Luckily, he struck the only tree in the vicinity, as he slipped, and it broke his slide at the very brink of a deep precipice. With the help

* See, also, in the NATIONAL GEOGRAPHIC MAGAZINE, "Cuzco, America's Ancient Mecca," by Harriet Chalmers Adams, October, 1908; and "In the Wonderland of Peru," by Hiram Bingham, April, 1913.

WEDDING GUESTS DANCE IN A VILLAGE SQUARE

Bolivian Indian fiestas may last from two to ten days, usually ending only when the supply of *chicha* (see page 149) is exhausted. In the middle of the circle of dancers the flute players are performing.

WOMEN OF THE BOLIVIAN HIGHLANDS WEAR MANY SKIRTS

The odd, helmetlike hats are homemade. These people, assembled before a church in a small town, form a social caste between Indians and whites.

LONG-HAIRED BOLIVIAN INDIAN RUNNERS WITH COCA-LEAF BAGS IN THEIR BELTS

They carry mails and run long errands, often going farther in a day than a man on a mule, since the mounted courier must follow a trail, while the footman makes short cuts. These men escort travelers from one inn, or *posta*, to the next, and frequently are afflicted with sore backs, like pack mules, from carrying heavy loads. They chew coca leaves as a stimulant.

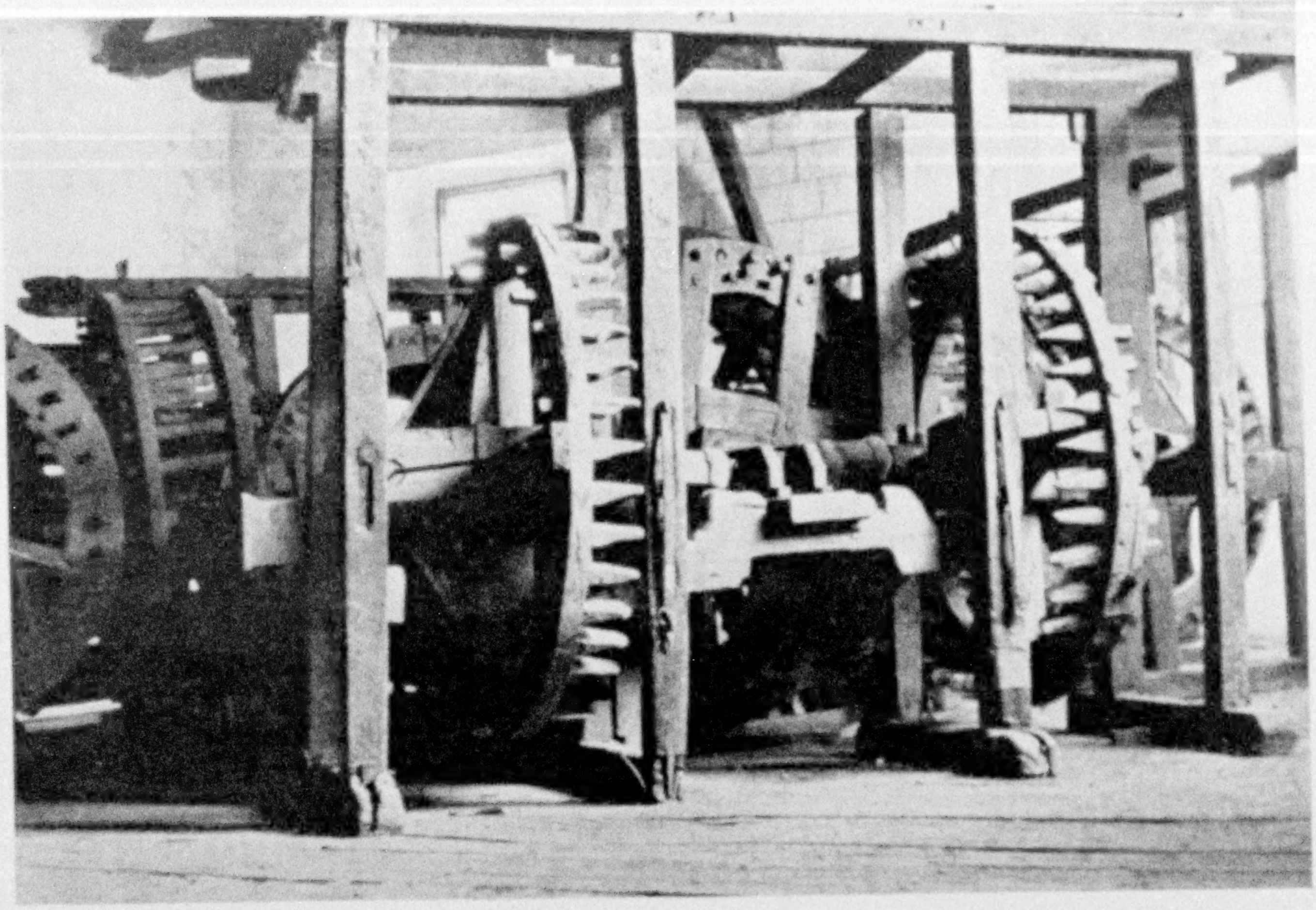
of friendly Indians, he was rescued after several arduous hours. Often the trail was so steep and crooked that my riding horse had all he could do to make it alone, without being bothered with a man on his back; so I walked, led one horse, and the other followed.

UNABLE TO FOLLOW THE OLD INCA HIGHWAY

All along the trail to Ayacucho I saw signs of the Inca civilization that was. Between Quito and Cuzco once ran a great highway of the Incas. I saw fragments of it, but, of course, could not follow it. Long ago the bridges were destroyed and in many places not a trace of the road now remains.*

Weeks of rough life in the open had so hardened me that I could sleep, no matter how strange or uncomfortable the place

* See, also, "Along the Old Inca Highway," by Harriet Chalmers Adams, in the NATIONAL GEOGRAPHIC MAGAZINE for April, 1908.



THIS WOODEN MINTING MACHINE WAS BUILT 350 YEARS AGO

In the ancient royal Spanish mint at Potosí, Bolivia, this machine—made of hardwood, held together by rawhide and wooden pins—is as solid as when built. If its dies were replaced, it could coin money now (see text, page 151).

PERUVIAN INDIANS EATING CORN AND DRINKING CHICHA

The men make their own woolen caps, three of which are seen here. By an odd local custom, these Indian women lift their hats when greeting friends on the street.

QUICHUA INDIANS HOLDING MANCHA AND GATO, IN THE HILLS OF NORTH BOLIVIA

These natives, who wear rawhide sandals, cotton trousers and blankets, live on barley soup and dried goat meat. They own many dogs, as well as some llamas and chickens, but are an impoverished tribe.

where night overtook me. My great necessity was that there should be fodder for the horses. Food for myself I had to have, of course, and in this bare land I certainly came to realize that one who begs cannot be a chooser. The Indians, particularly the Aymarás, generally refuse to sell or give anything in the food line to a white, and the answer one hears upon arriving at their huts in quest of food is always the same, *"Janua,"* meaning "There is none." Anyone unfortunate enough to visit these parts is bound to learn that word before any other. In saying good morning to passing Indians I several times received the stock answer of "Janua." That is the only word most of them know to say to a white.

I learned enough Aymará to be able to ask the most necessary questions, but I was unable to understand their answers, this guttural language being extremely difficult to the unaccustomed ear.

A HEARTY WELCOME AT AN AMERICAN MINING CAMP

Bad and scarce the food was, of course, but it kept us going. We ate and slept, not for comfort, but only that we might keep moving onward. So, after many a long and tedious march over mountains and through valleys, we came to Ayacucho. From there, because of heavy rains and washouts, I had to make a detour on the road to Huancayo. Here, every Sunday, the Indians hold a market day. As many as 30,000 may come to town. Some bring their goods on burros, but the majority carry their packs on their own backs.

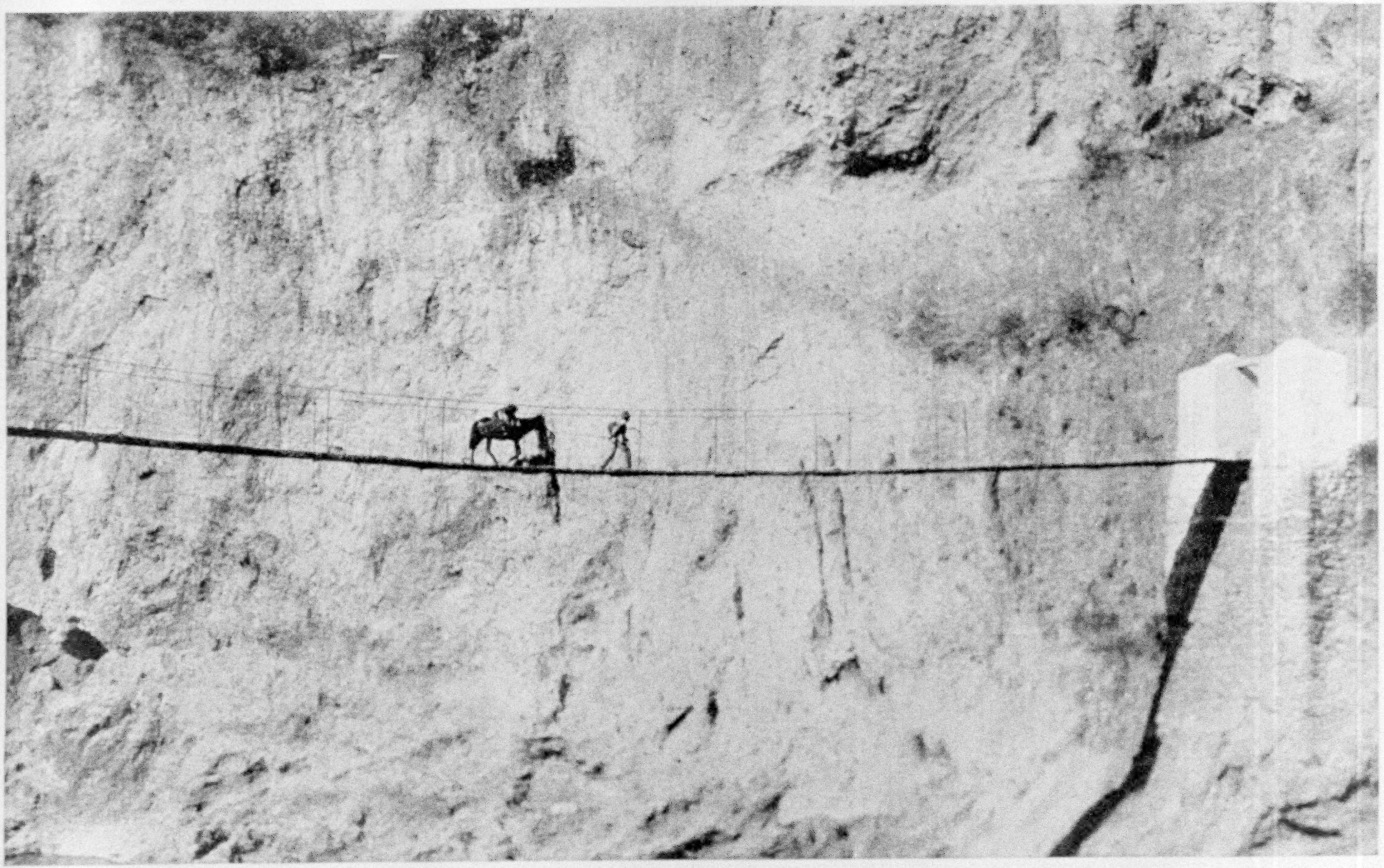
To me the finest thing about Huancayo was that now the second big Andean range lay behind, and before me lay the last and easiest of the three. Best of all, my horses were in excellent condition. I had every reason to feel hopeful.

After a few more detours over rough mountains and at times over a good road, we arrived at Ticlio, 16,000 feet above the sea. What is said to be the highest railroad in the world reaches this point, and an American company operates some important gold mines near by.

Always when I came to mines operated by foreigners I was given a hearty welcome and regretted that I must so soon saddle up and march off again. In cities,

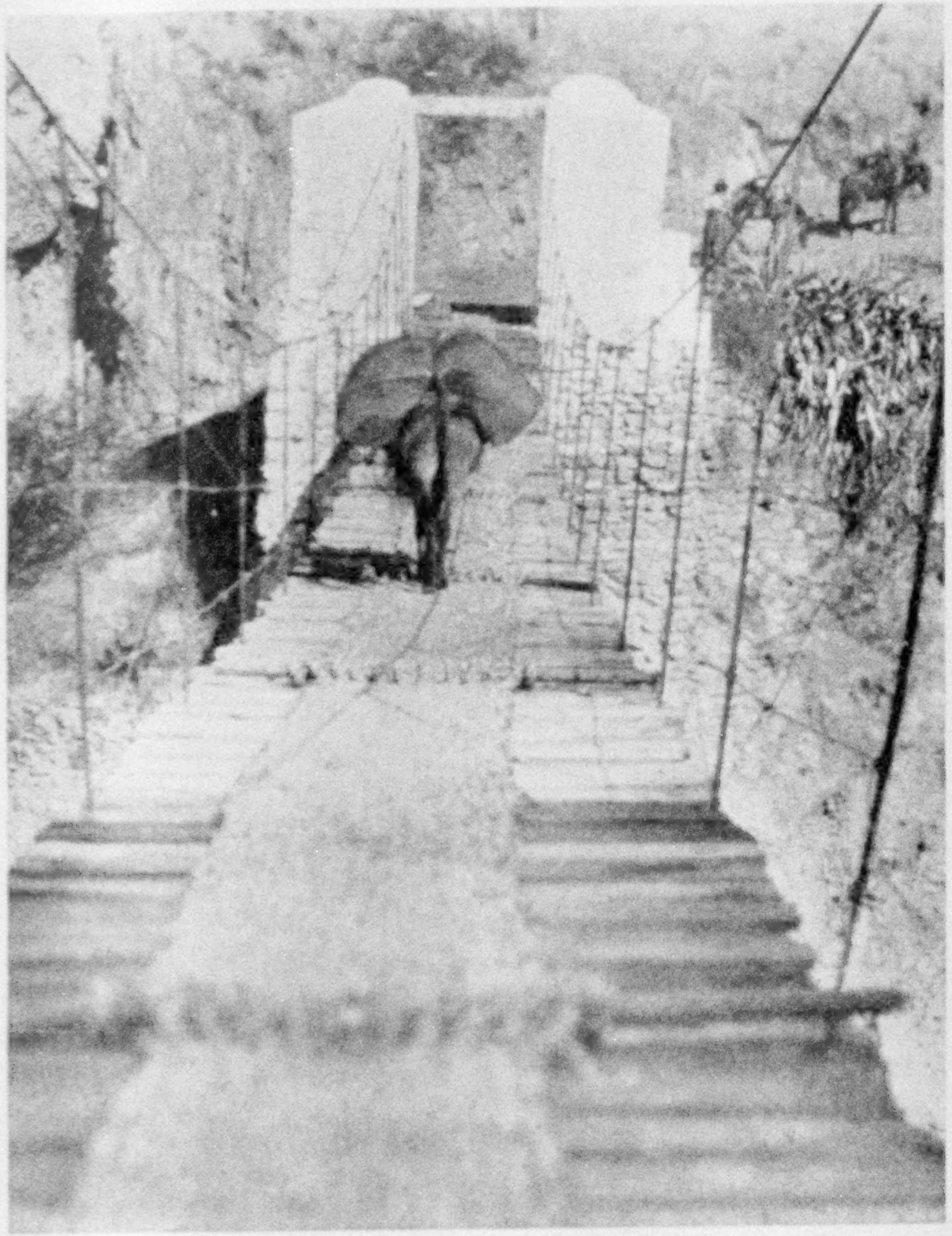
CYCLOPEAN RUINS OF AN ANCIENT RACE AT TIAHUANACU, NEAR THE SHORES OF LAKE TITICACA

Majestic, mysterious, their origin lost in dim, forgotten centuries, these giant stone pillars challenge the imagination of modern man, who speculates in vain as to who put them up, or when, or how (see, also, "In the Heart of Aymará Land: A Visit to Tiahuanacu, Perhaps the Oldest City of the New World," by Stewart E. McMillin, in the NATIONAL GEOGRAPHIC MAGAZINE for February, 1927.



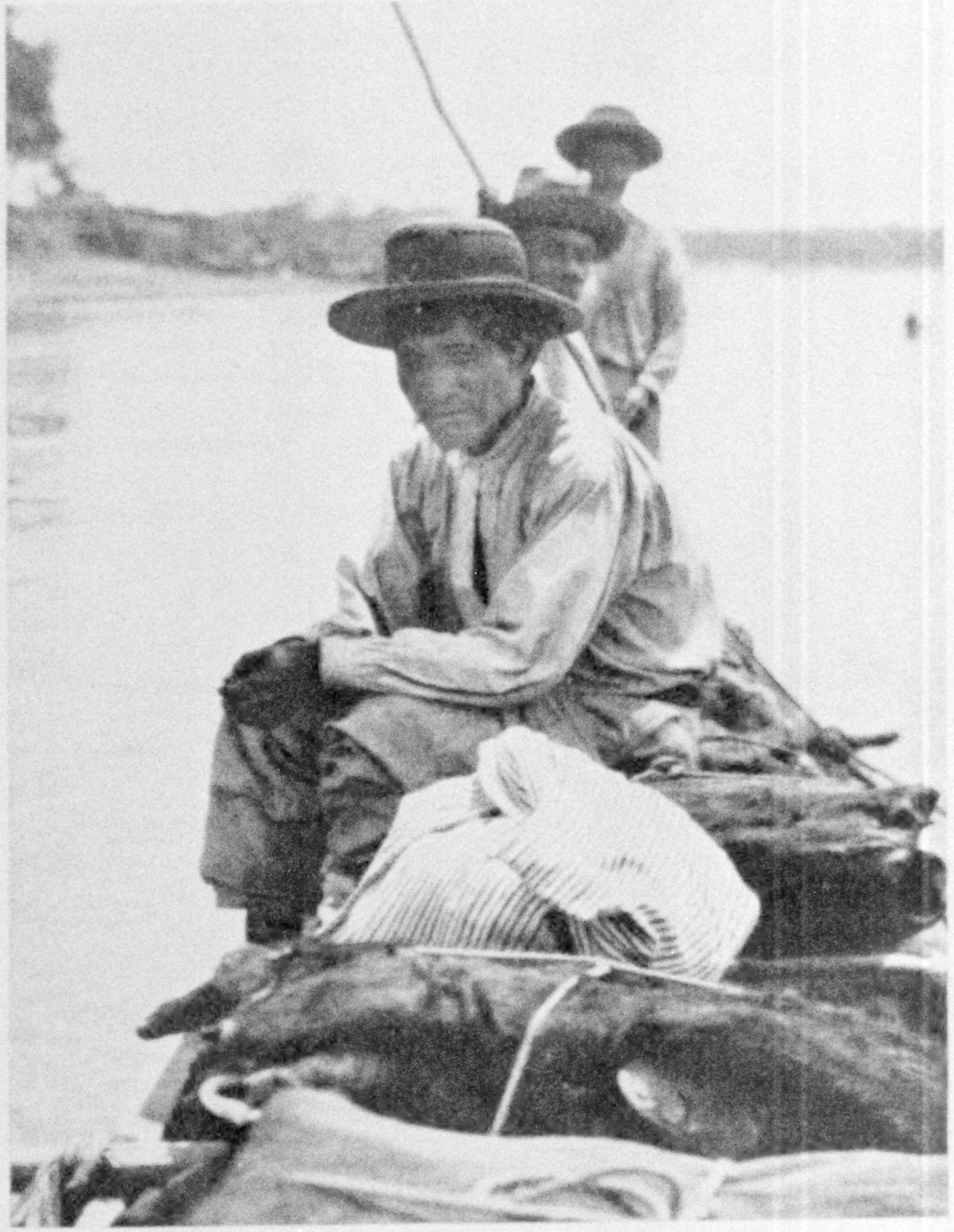
A BRIDGE WHERE EVEN A TIGHT-ROPE WALKER MIGHT NOT ALWAYS BE AT EASE

Spanning a chasm in Peru, this toll bridge swings on wire cables. The horse on the bridge is Gato, being led by an Indian. Nervous travelers are often blindfolded, strapped on a stretcher, and carried over this swaying path.



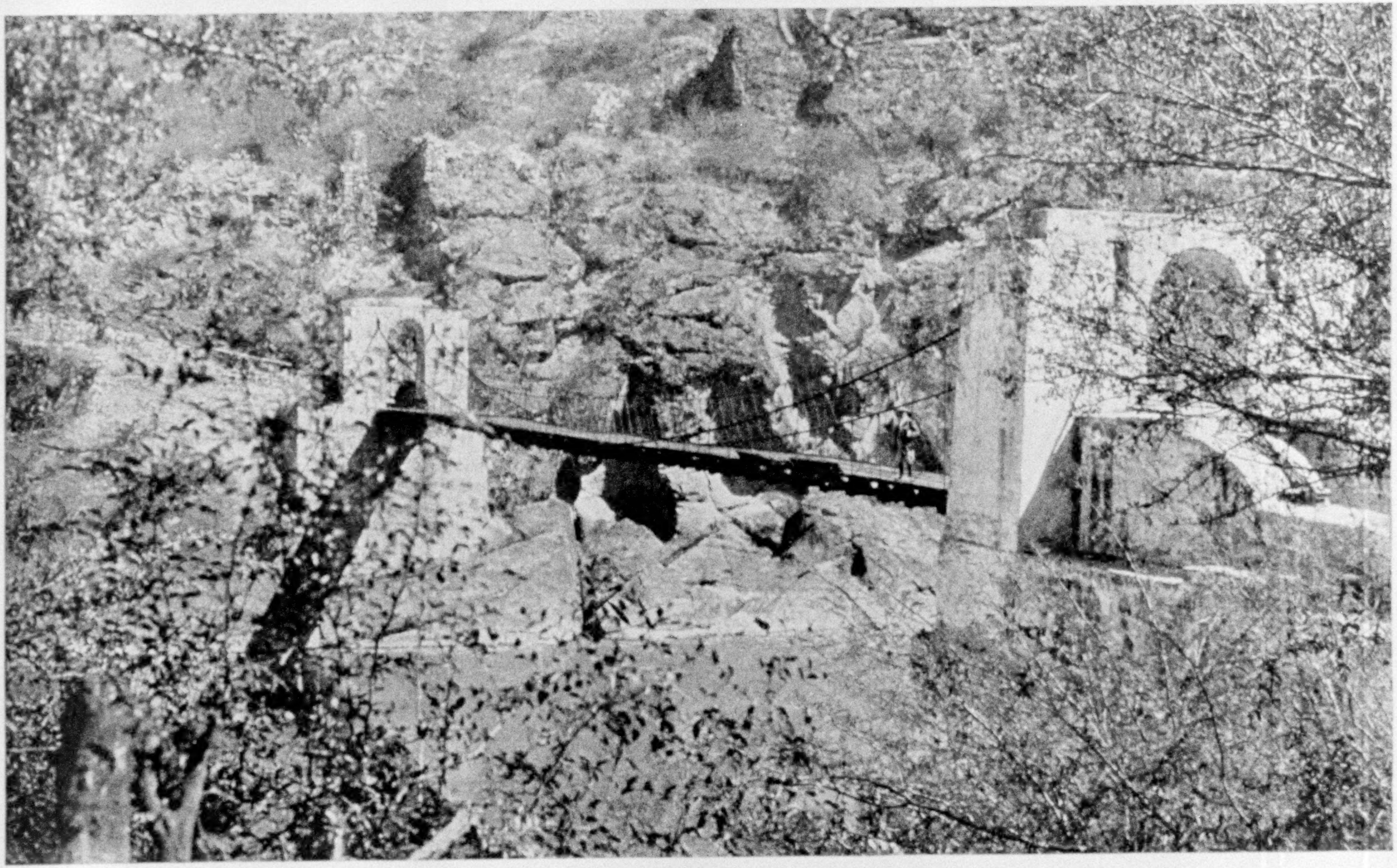
A PACK MULE CROSSING A SWINGING CABLE BRIDGE

Crosspieces of wood are laced together to make these dizzy suspension bridges of upper Peru. Fiber mat prevents animals from slipping, and only a thin wire protection guards the sides, high above the canyon (see, also, illustration, page 159).



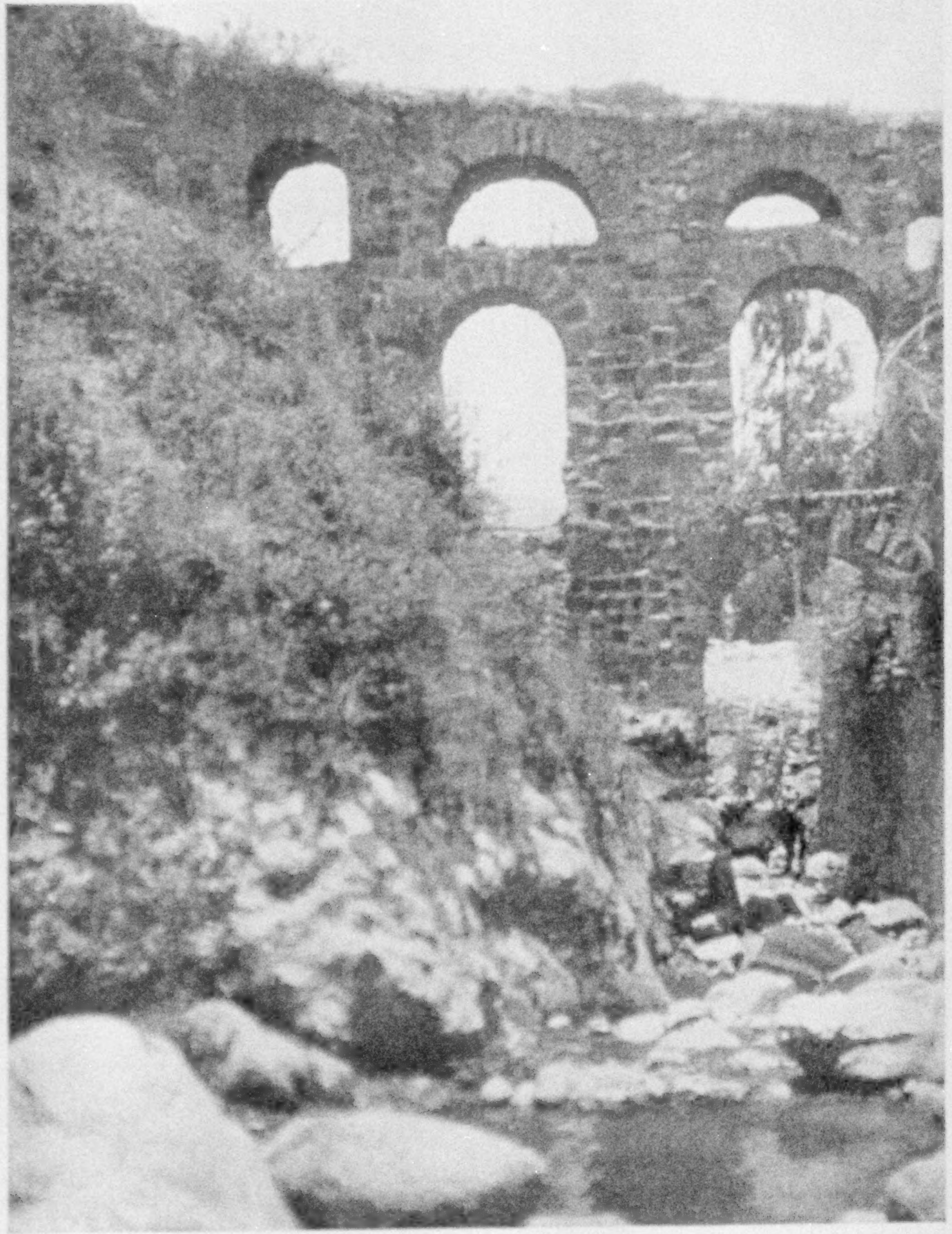
WHETHER ONE RIDES THE FERRY OR SWIMS, HE MUST PAY

Peruvian boatmen hold licenses or concessions for ferries across numerous rivers, and no matter how the traveler crosses, he must pay. The author swam his horses here, but saddles and packs were carried over by boat.



BETWEEN CUZCO AND AYACUCHO, IN PERU, THE OLD TRAIL CROSSES THE APURIMAC RIVER

Men and animals, through long centuries, have worn old trails deep into hard rock (see text, page 172).

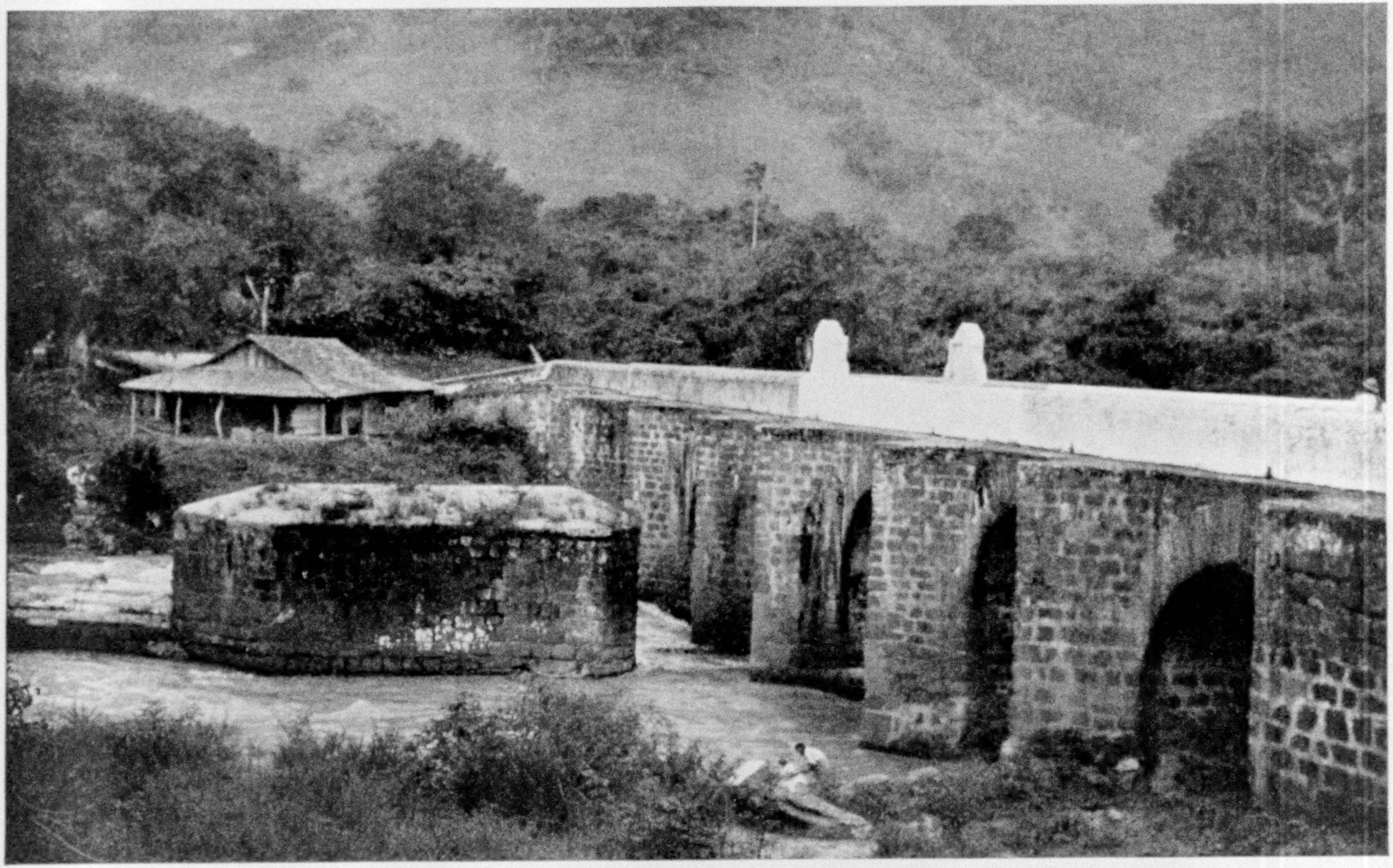


MANY GOOD BUILDERS CAME WITH THE SPANIARDS

An excellent example of early Spanish masonry is seen in this abandoned aqueduct, near Cuzco, Peru. In numerous regions of Latin America one sees remnants of roads, stone bridges, and aqueducts built by Spaniards, but which have been allowed to go to ruin.

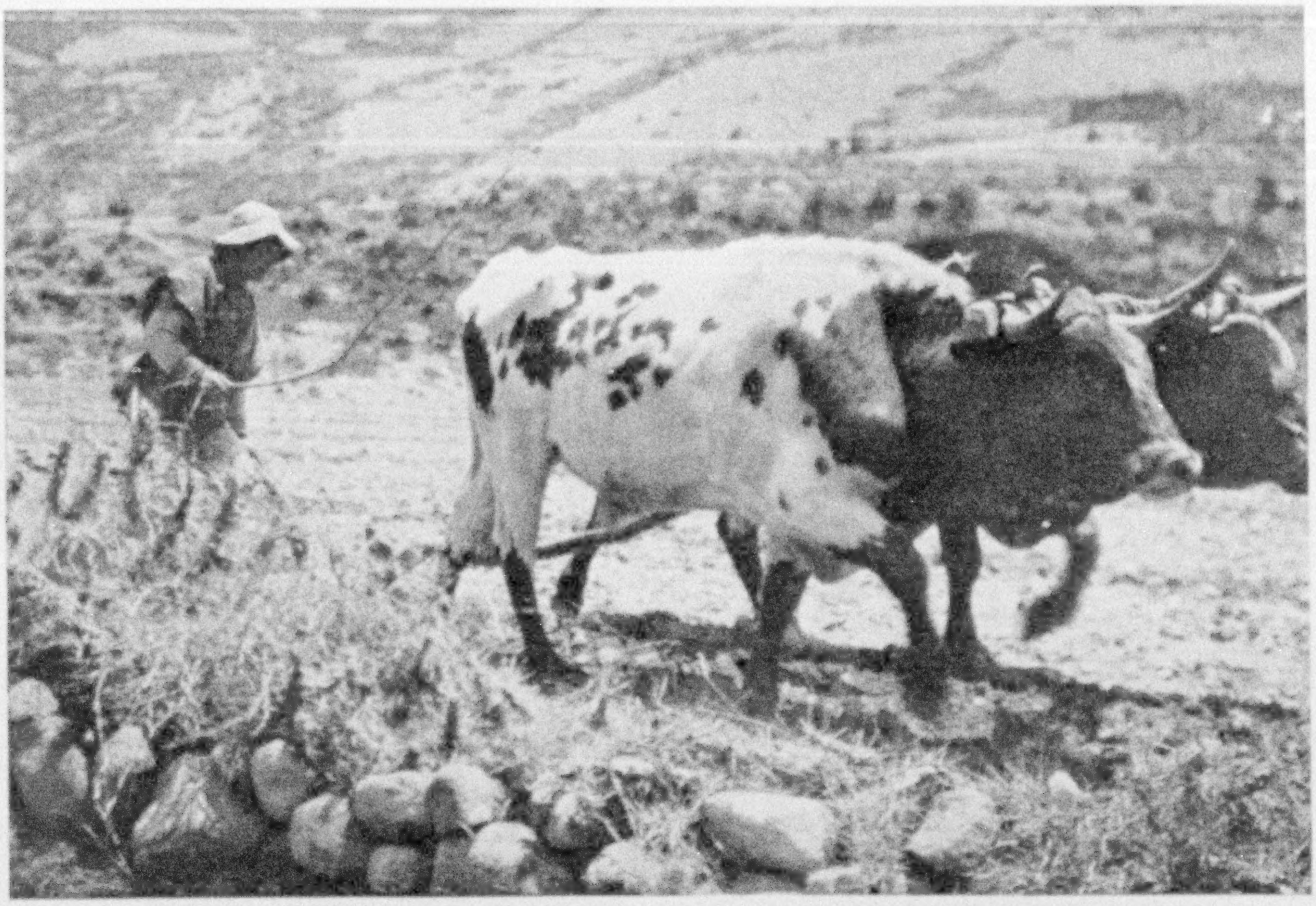
A WAYSIDE CROSS AND SYMBOLS NEAR A PERUVIAN TOWN

Atop the cross is a figure of the cock that crew three times; on the cross-arms are the sun and moon that stood still; two ladders, Jacob's and that used to take Christ down from the Cross; also, the lance with which the Roman soldier pierced His side, and other Biblical symbols.



ALONG THE OLD SPANISH GOLD TRAIL BETWEEN POTOSÍ AND LAKE POOPÓ

Long ago this was a favorite route of the Conquistadores. To-day only occasional Indians use it. The Puente del Diablo, or Devil's Bridge, built by early Spaniards near Potosi, Bolivia (see, also, text, page 151).



SOME ANDEAN INDIANS FEAR TO USE STEEL PLOWS LEST THEY POISON THE GROUND

Few foreign-made farm implements have found their way into the hands of South American Indians. This Peruvian still uses a wooden plow.

especially in South America, my arrival created quite a sensation.

One thing I learned, too—that the average better-class native knows practically nothing about the interior of his country; but wherever I met American, English, or German engineers, they would naturally ask for as much information as possible about the trails, as they often go out on hunting or prospecting trips.

From Ticlio we went on down through ravines and steep slopes toward the Pacific Ocean. The thermometer began to rise as we slipped and stumbled coastward. Finally we came to the outskirts of Lima. The sudden change of atmospheric pressure affected my hearing and the sticky heat was almost unbearable. Sunburnt, dusty, and very hot in my heavy clothes, I stabled my horses at the Lima race track and went to a hotel. Here some Government officials waited to make me welcome.

A LONG STOP IN STATELY LIMA

At Lima, one of the stately cities of South America, I remained for three weeks, not only to rest, but also to get the horses accustomed to the climate. At times Lima is very hot, being almost at sea level and only 12 degrees from the Equator.

Because I knew full well what sandy, difficult desert coast lay between Lima and Ecuador, I took every precaution. My heavy mountain clothes I changed for light, cool things, and I modified my pack-saddle, as there would be no more climbing for a long time. I let the horses' manes and tails grow long, as a long mane protects the neck from the fierce sun, and a long tail fights off flies and other pests that tantalize a horse in the Tropics.

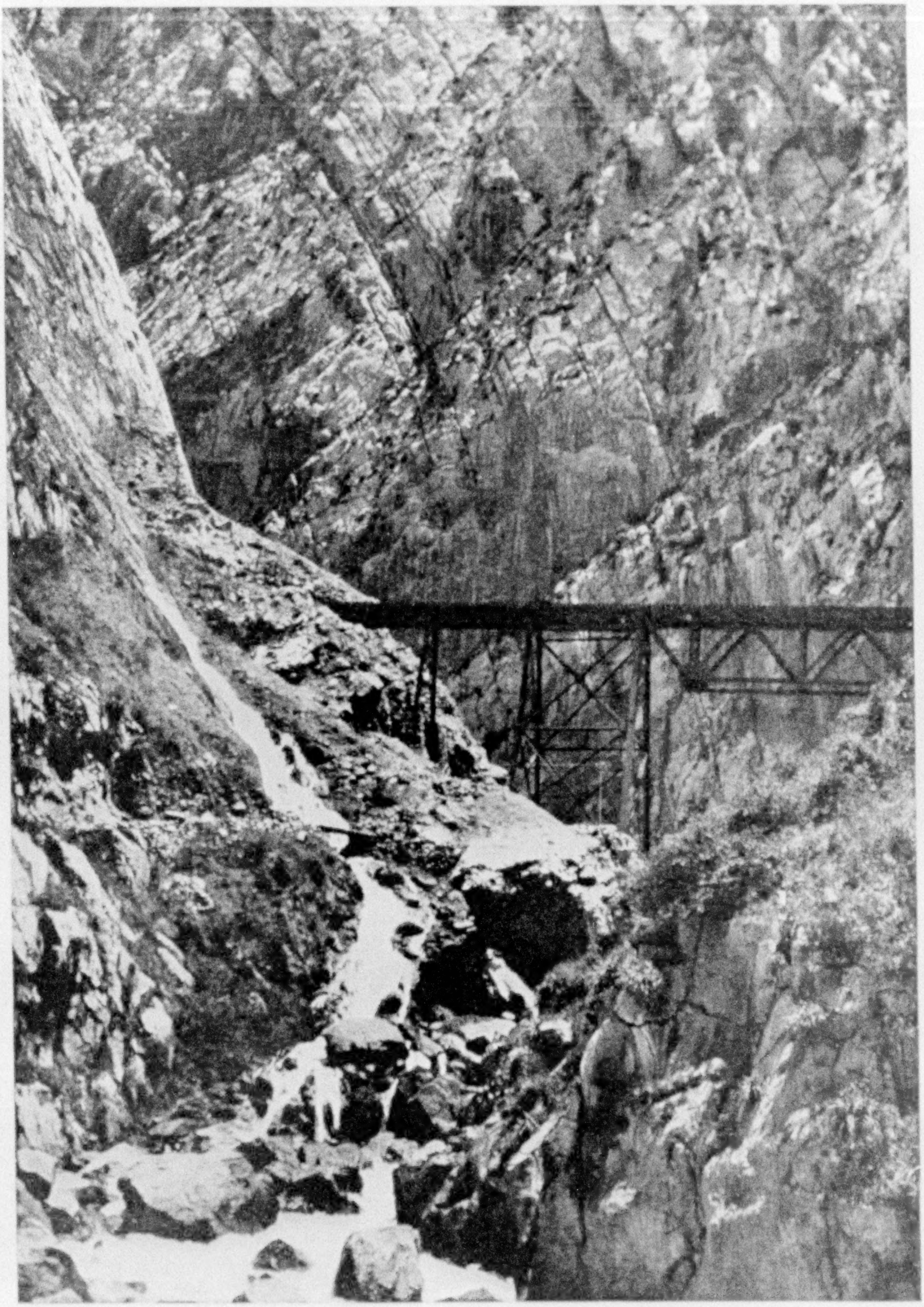
The trail ahead lay along the Peruvian coast, where rain is almost unknown. Villages and towns stand only on the short rivers which run down from the Andes and cross the dry coast to the sea. The hot valleys are watered by canals, and where such irrigation is practiced fine crops of sugar cane, cotton, and rice are grown; but between these remote valleys stretch the sandy deserts, where nothing grows and where the sand dunes rise one after another like huge ocean billows. Here the heat is terrific and there is absolutely no water (see, also, page 170).

HERE PASSENGERS CROSS A RIVER IN A MOVING BASKET

By means of a moving, double cable wound on a drum, travelers are carried across the turbulent Rio Santa, on the coast of Peru. The author's horses, having to swim, were carried a mile downstream.

CROSSING THIS SWAYING BRIDGE IS NO PLEASANT FEAT

Made of fiber and roots, the structure is anchored by weighting its ends with heavy rocks. Indians build these bridges for their own use.



A TRAIL UNDER A BRIDGE ON THE CENTRAL PERUVIAN RAILWAY

That mysterious and much-dreaded disease, verrugas, plagues the people hereabout. Many died of it during the construction of this railway.

A MISADVENTURE IN ANDEAN RAILWAY ENGINEERING

To reach the Cerro de Pasco mine, a spur from the Lima-Huancayo Railway climbs to more than 16,000 feet elevation. This engine fell from a bridge while that line was under construction.

The first leg of my ride from Lima was to Ancón, a small seaside resort 22 miles away. Even before reaching it I got a good taste of sand and desert. It was near Ancón that the last battle of the Chile-Peruvian War was fought. Here dead soldiers were buried in the sand, often many in one grave. Winds now have uncovered these graves and skeletons lie scattered about with the hair still attached to many of the skulls.

From Lima to Ancón runs a railroad. But there is no through railroad up and down the coast, though a few small lines run from tiny seaports to towns in the irrigated valleys.

Even before the days of the Incas, the local Chimu, or Yunca, Indians had irrigated many regions which are now empty deserts. I saw the ruins of their towns, their forts, canals, and burial grounds, which tell the sad story of invasion (see illustrations, pages 169 and 171).

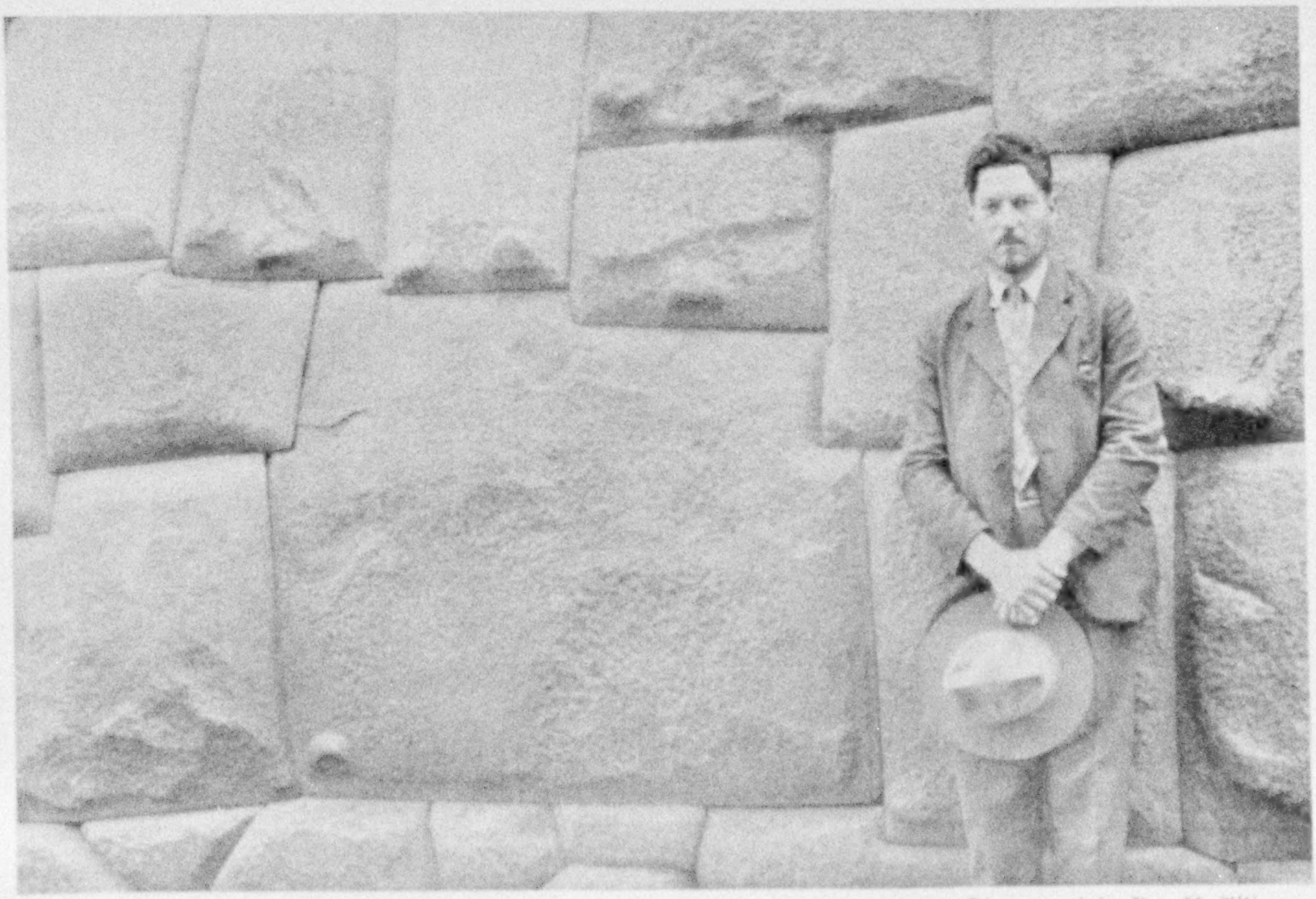
On this march we had to traverse one desert which was 96 miles across. My horses achieved this almost incredible feat in 20 hours. Part of the time we traveled at night, with a full moon as guide. When I could, I led the march along the sea beach, where the sand was firm and easier for the horses than the soft, hot ground back from the shore, where the animals sank deep with every step.

CARRIED NO WATER THROUGH DESERT REGIONS

Contrary to the practice of most travelers in dry regions, I carried no water. For my own use I had a flask filled with lemon juice, sugar, and salt, mixed. This concoction was very stimulating, but tasted so badly that it was never any temptation to drink it all at once. As for the horses, I calculated that the energy wasted by them in carrying water would be greater than the actual benefit derived from drinking it. So they could drink only when we came to water along the trail. I believe my theory was sound; with a light load, we gained in speed and thus came the

EQUINE STUDY OF A STONE MAN AT TIAHUANACU

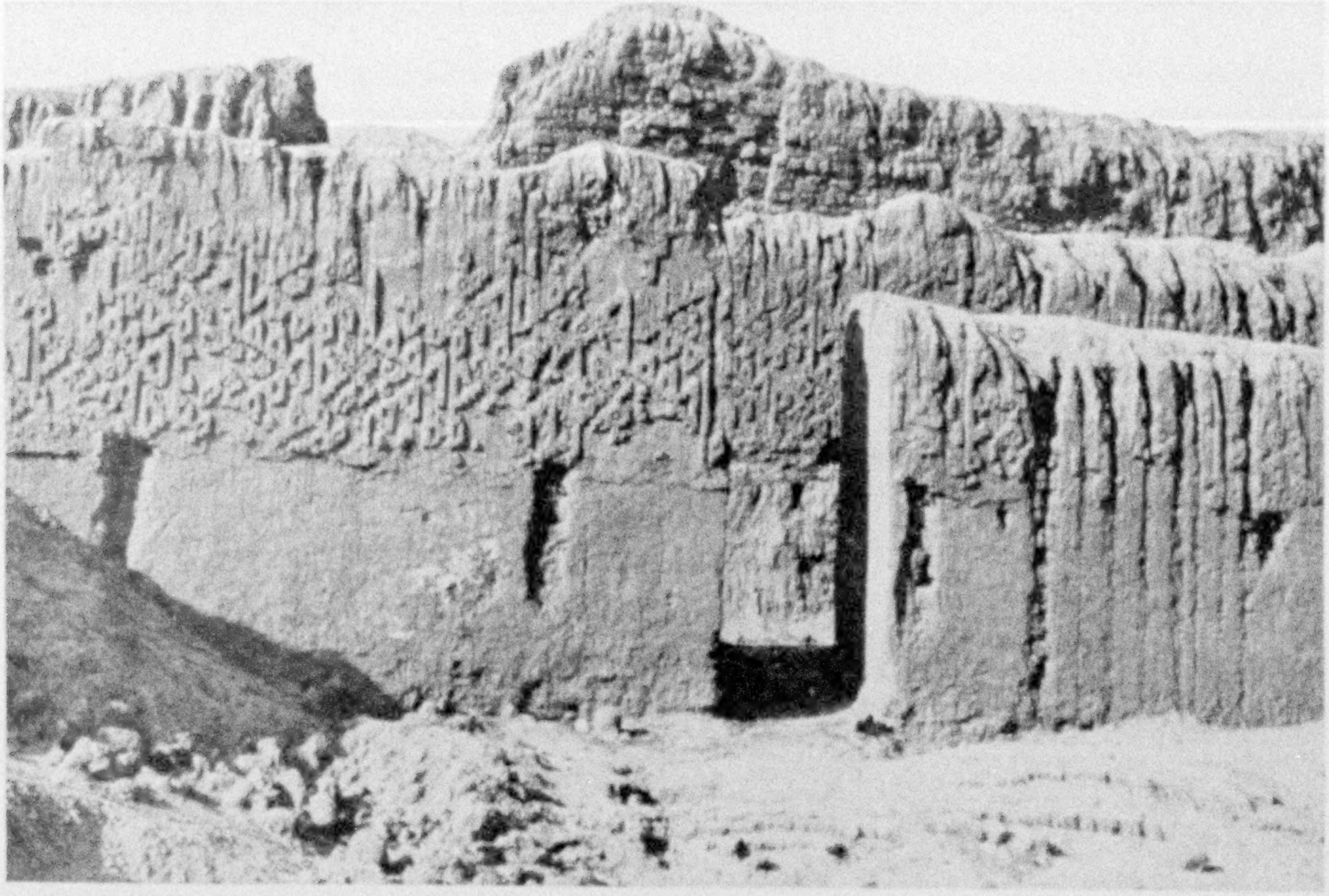
The horses stand on the floor of an ancient temple, facing a monolith. In the background once stood an Inca bath; behind the horses was the Gateway of the Sun.



Photograph by Roy H. Elliott

MODERN MASONS CANNOT SURPASS THE PRECISION OF OLD INCA STONECUTTERS

This famous 12-angle stone appears in an ancient wall at Cuzco, Peru. Though fitting so closely that a knife blade cannot be inserted between the stones, no mortar was used. Many churches in Cuzco were built on the foundations of prehistoric buildings.

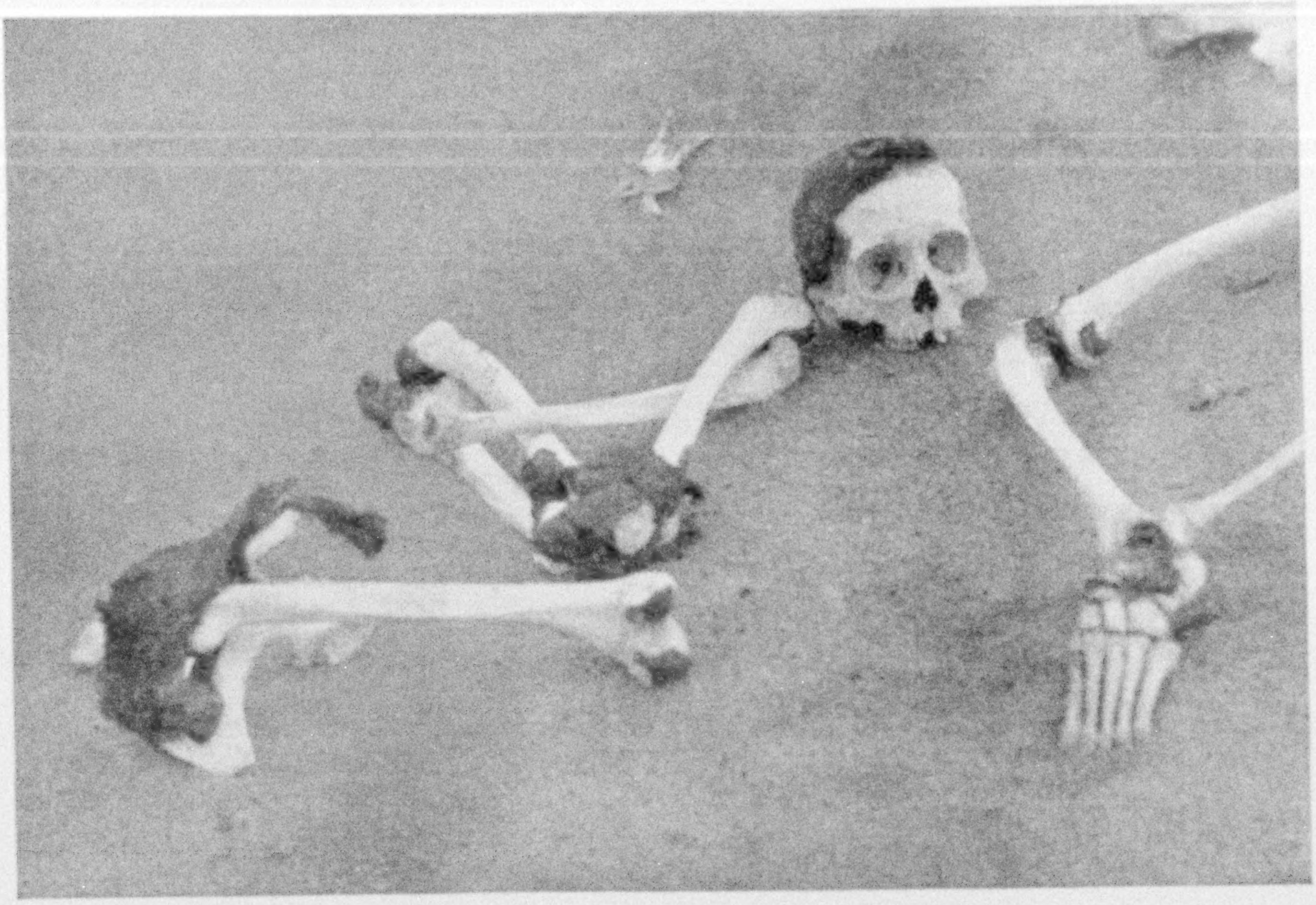


PREHISTORIC PATTERNS ARE NOW COPIED IN RUGS AND BLANKETS

The ancient design on this Chan Chan ruin near Trujillo, Peru, resembles somewhat the Aztec patterns of Mexico; but the latter are cut in stone, while this is molded adobe.

CHAN CHAN ROSE AND FELL BEFORE THE SPANIARDS CAME

Eleven square miles of pre-Inca ruins near Trujillo mark the site of the former capital of the Great Chimu. Before the Inca conquered him, he ruled for 500 or 600 miles along the Peruvian coast. This ruin is believed to have been the Chimu place of execution.



IT IS UNSAFE TO TRY TO CROSS PERUVIAN DESERTS ON FOOT

On a wager, this unlucky adventurer set out shortly before the author, to walk across a desert stretch (see, also, text, page 164).

sooner to where there was water. Only on rare occasions did the horses seem to suffer from excessive thirst.

On this march up the coast I found many of the streams running high. As there were no bridges, we crossed them by swimming. Swift currents and quicksands on the river banks made this at times very dangerous. More than once we had bad frights and narrow escapes, but luck was with us.

The only difference between Dante's Inferno and these deserts along the coast of Peru is that one is imaginary and the other very real. True, I traversed these deserts safely with my horses, but I would not try it again for all the money in the world. It was with infinite relief that I put the last of these singular wastes behind me and crossed the Ecuadorian border into the little town of Macara.

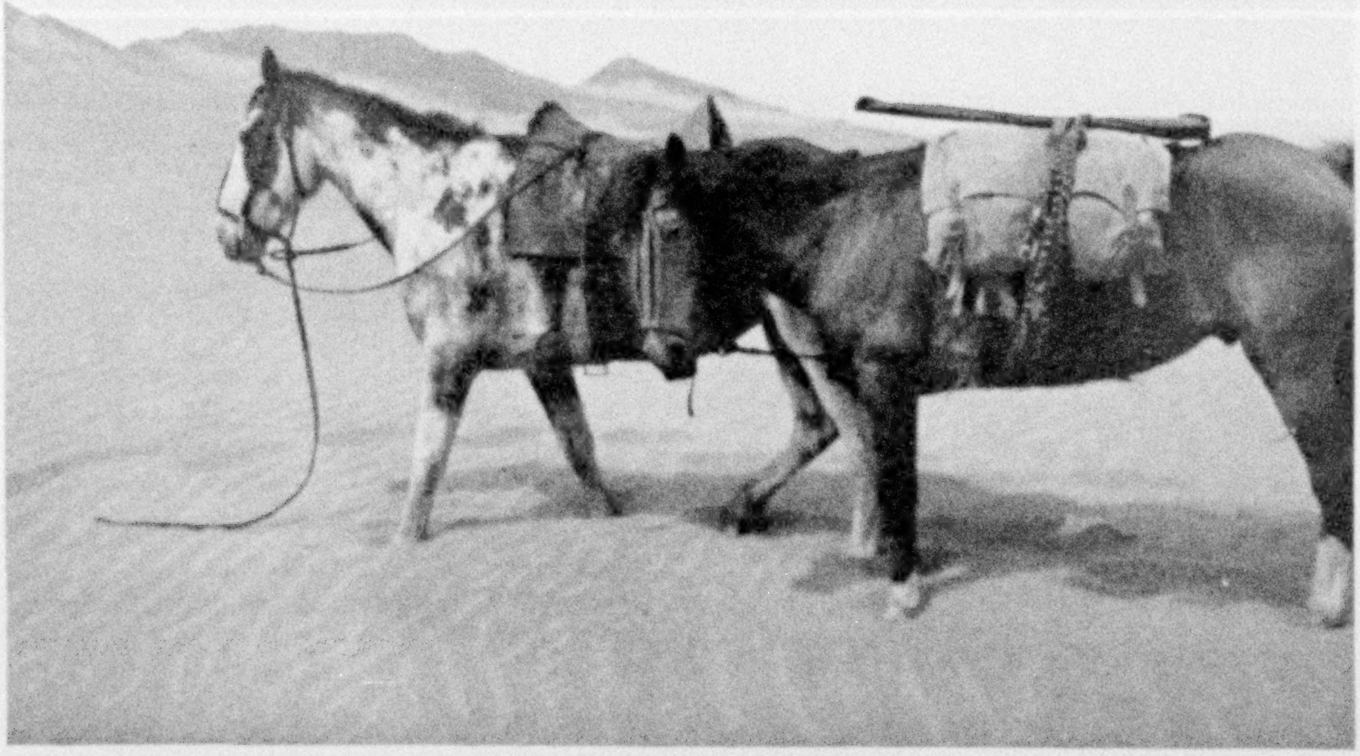
Here, because the coast of lower Ecuador is so swampy, we were obliged to take to the mountains. In fact, I doubt if it would be humanly possible to force horses through the dense jungle along the swampy coast of Ecuador.

We had now covered more than 4,000 miles and I was glad to climb up to a cooler climate; yet I little dreamed of what hardships awaited us in the network of mountains and deep valleys that lay ahead.

AN INDIAN ORPHAN JOINS THE PARTY

Shortly before arriving at the town of Loja I picked up an Indian orphan boy about 16 years of age. He was ragged and hungry. I fed him and he became attached to me, perhaps because I was the first person who had treated him well. He had no idea where I was going, but insisted on accompanying me. I decided to test him. Although he was barefooted, I made him follow me for a few days, over stony trails and through the mud. When convinced of his good sportsmanship, I bought him a little black Indian pony, some clothes and footwear. Victor was his name, and we christened his pony Chico.

With this increased caravan, I pushed on. The boy's only work was to act as watchdog, when I had to leave the horses to search for food or for some other reasons. Already I had been robbed several times. Let me break my narrative to cite one incident:

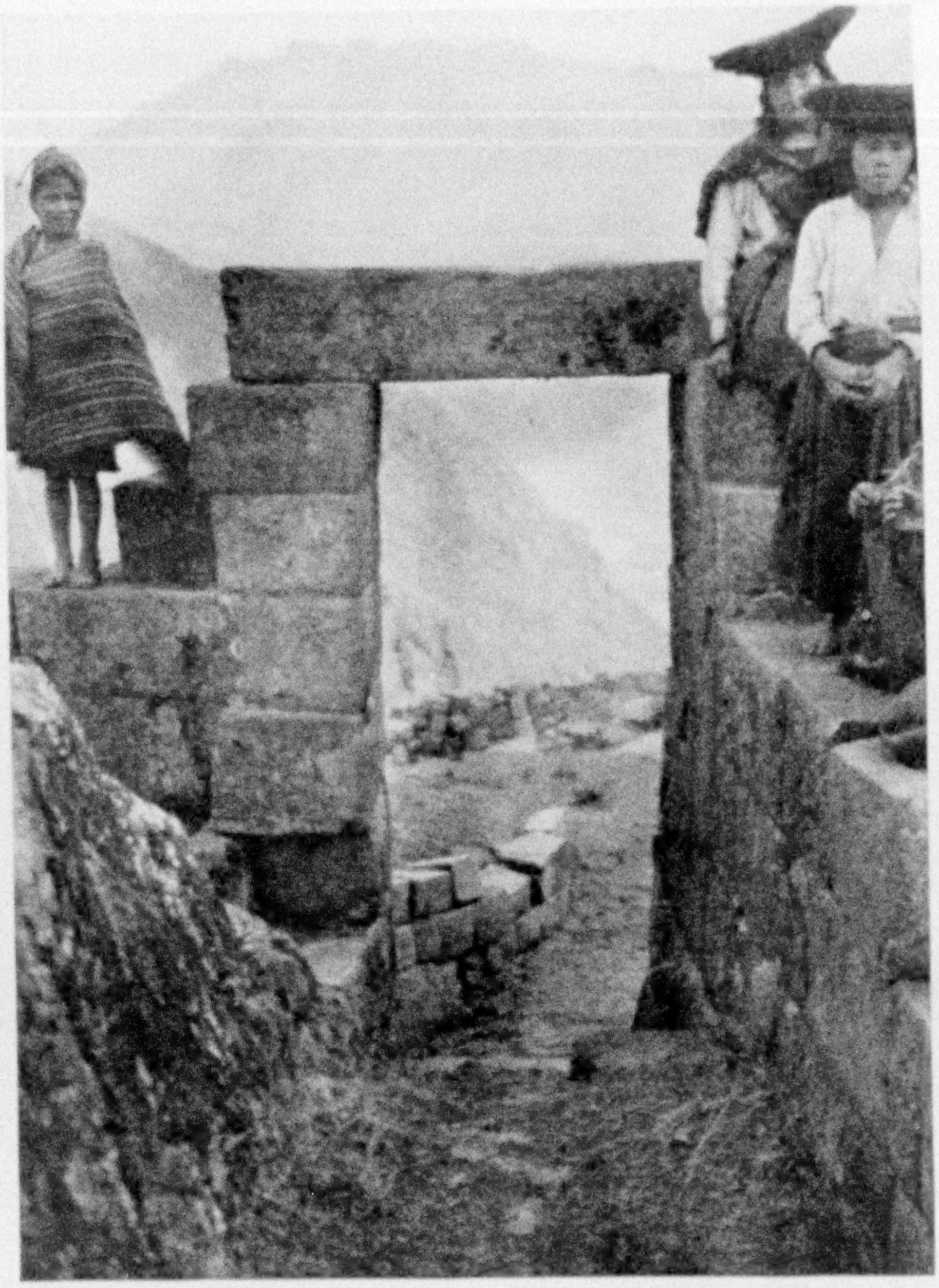


IN DESERTS OF THE PERUVIAN COAST THE HORSES WADED IN DEEP SAND

To escape scorching sun, many stages were made at night. Because the march across would have required several days, the author avoided the Sechura Desert, in the north of Peru. Water was never carried, either for man or beast (see text, page 167).

FOR GENERATIONS TREASURE HUNTERS HAVE DELVED AMID THE RUINS OF PRE-INCA CIVILIZATION

In this burying ground mummies were found of Chimu Indians, a tribe conquered by the Incas (see, also, text, page 167).



YOUNG GOAT HERDERS AMONG RUINS NEAR CUZCO, PERU

for the equivalent sum to his account in the bank there, if I wished!

Victor turned out to be a fair cook and a good fire-builder. We soon became good pals. His queer questions would keep me amused for hours.

A MOUNTAIN FREIGHT TRAIL

A rough, mountainous, but much-traveled road connects Loja with Cuenca; but only saddle and pack animals can travel over it. It is too narrow and rough for vehicles, so the considerable volume of goods and the passengers that move over it are all carried on pack animals. With loud cursing and shouting, the *arrieros,* or drivers, wind their blasphemous way uphill and down.

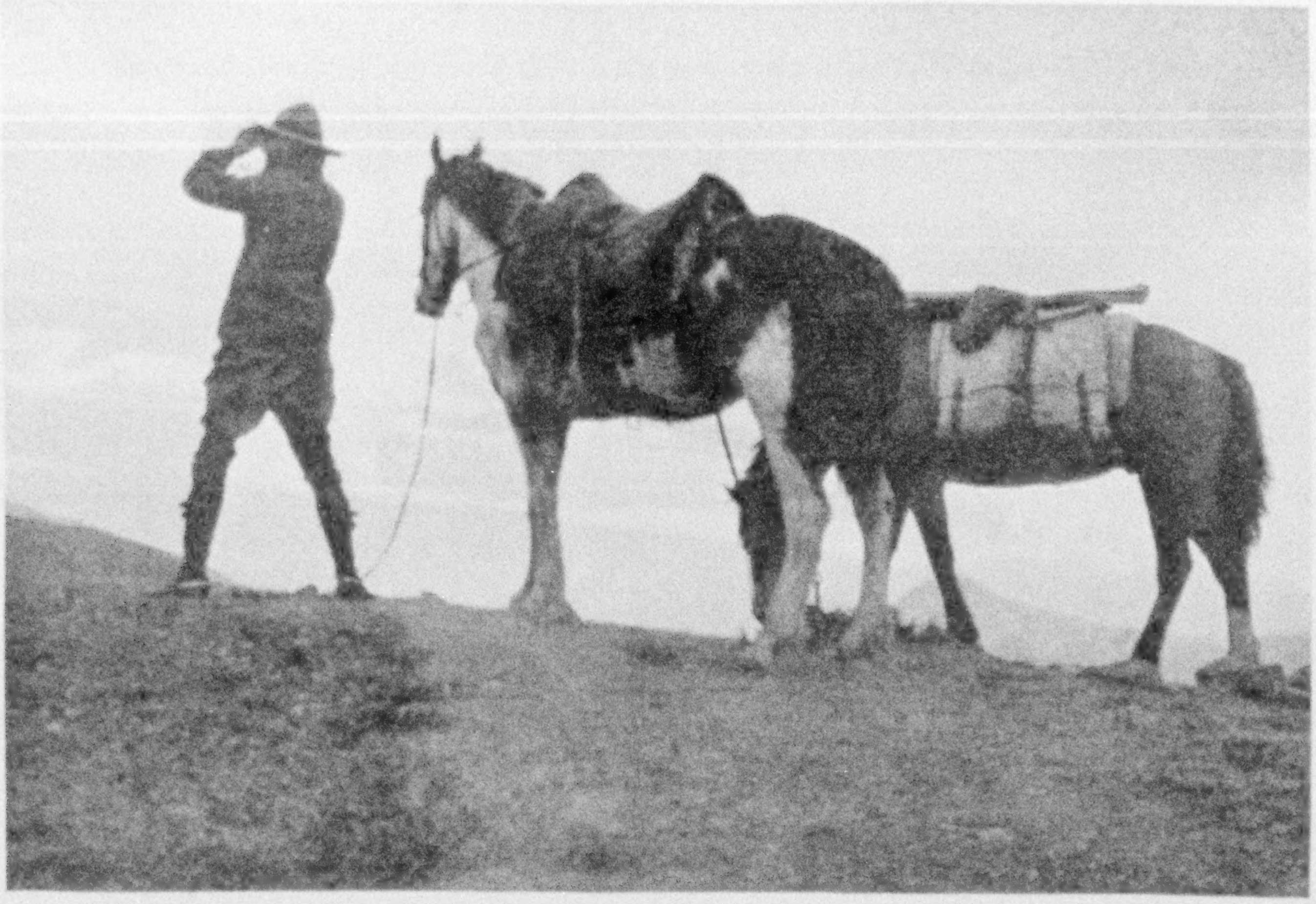
Regular steps, *camellones,* as they call them, are trodden into the steep trails, where the ground is soft. Because my horses took longer steps than the mules and burros that had made these camellones, they often stumbled at first. Later they got used to the short and tedious way of stepping between these holes worn by thousands of former hoofs.

In some stretches of this road the mud was so deep that the horses sank almost to their bellies. Sometimes they fell down, completely covering me as well as themselves with mud and slime.

Over this bad road, among other freight, heavy things like machinery, pianos, and billiard tables are transported. Articles too big to load on mules are set on a framework of poles and carried by a squad of Indians.

I also saw whole families moving. Children were carried in baskets, two of which

In one country, which I prefer not to mention for obvious reasons, all my money was stolen from the saddlebags while I went out to get something to eat. I was in a most embarrassing situation, for there was no telegraph office or bank in the neighborhood. Hearing of a prosperous hacienda, I went some 20 miles to find the owner and explain my situation to him. He might easily have taken me for an impostor or even a swindler; but, after having heard the story, he emphatically apologized to me, expressing his regret that such a thing had happened to me in his country. Then, without hesitation, he offered me as much as I had been robbed of, if this would be sufficient to see me to the next town. All he suggested was that I should be kind enough to deposit a draft



CROSSING A RIDGE NEAR THE APURIMAC RIVER, IN UPPER PERU

Amazing sunsets and cloud pictures appeared at points 10,000 and 12,000 feet above the sea. When this picture was taken mists obscured the hot valley to which the author descended, over zigzag trails, to find water and forage (see, also, text, page 153).

were lashed together and swung across a mule. The rest of the family, with pots, pans, parrots, and cats, were all piled on the sore backs of other mules. Meaning no blasphemy, my conception of hell is the life of these so-called "friends of man," the pack animals of the Andes.

At night we rested in inns where I could get sugar cane or dry corn leaves for the horses.

A LOCOMOTIVE THREATENS THE EXPEDITION

Frightful as this road was, we finally conquered it and reached the Guayaquil-Quito Railroad at the foot of the Nariz del Diablo (Devil's Nose). This is a zigzag that takes the trains up a formidable mountain side. There being no trail beyond this point, I had to lead my horses along the railroad track itself. An incident here almost finished our journey. Unexpectedly, a locomotive suddenly appeared. Quickly I squeezed the two horses into a narrow open space beside the track while the engine roared past.

About the foot of this mountain one steams in the hot and humid climate of the Tropics, but on reaching Alausí, at the top, it is delightfully dry and cool. Marching on, we followed the railroad or kept near it all the way to Riobamba. This town is beautifully located about halfway between the coast and Quito, the capital of Ecuador.

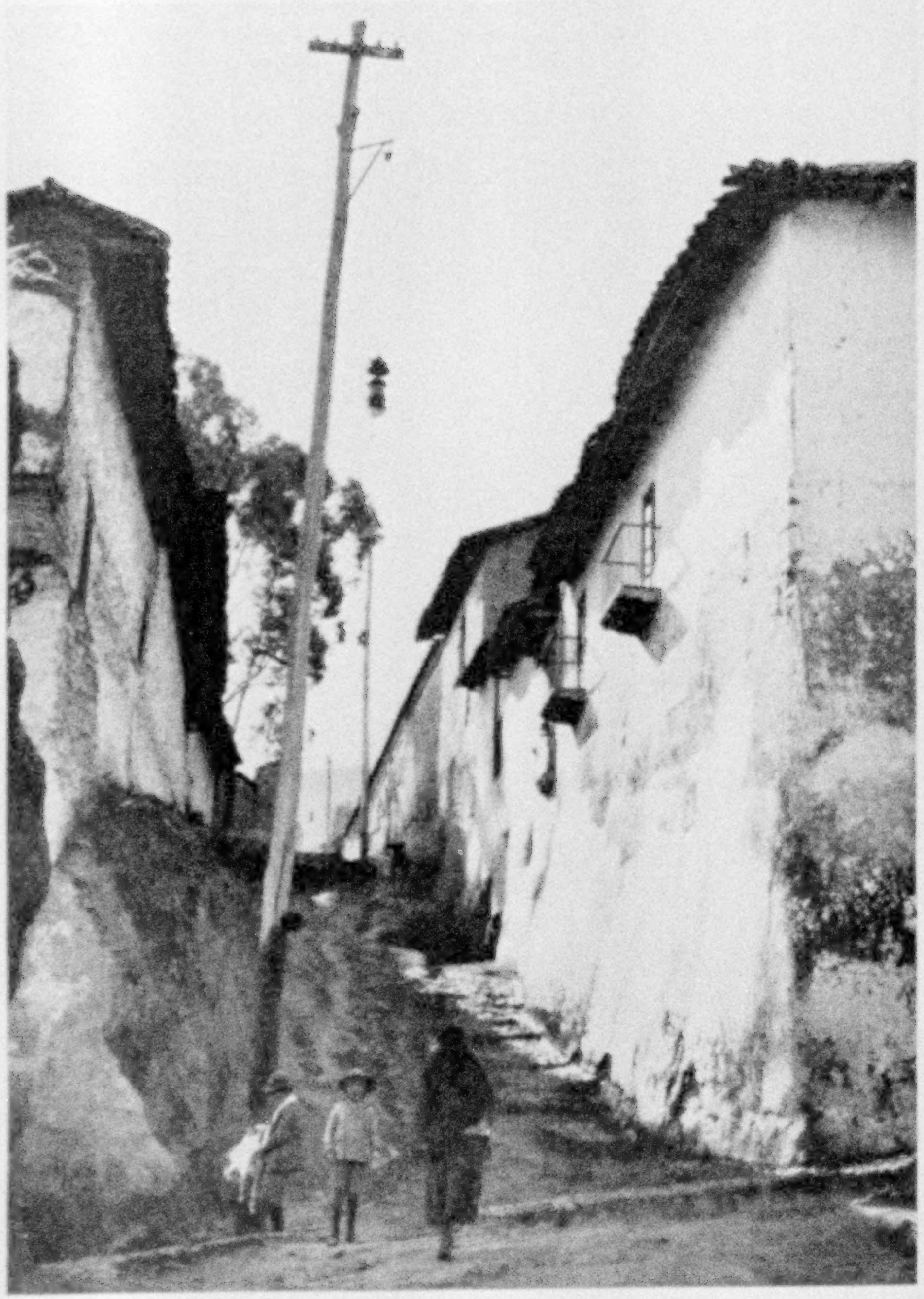
From Riobamba one looks out upon a panorama at once majestic and inspiring. To the west stands that snow-covered Andean monarch, Chimborazo; to the east rises the Altar, so named because, draped in white and with gigantic candles symmetrically arranged, it indeed resembles an altar. Blackening the horizon in his sullen wrath, the great volcano Tungurahua rises in the north.*

I found a fair road leading up the valley from Riobamba to Quito. Charming little villages, mostly inhabited by industrial Indians, lay along this road. Fruits and vegetables grew in abundance and the climate seemed one of eternal spring. Toward

* See, also, "The Volcanoes of Ecuador," by G. M. Dyott, in the National Geographic Magazine for January, 1929.

HIGH UP INTO ANDEAN SKIES CLIMB THE RAILWAYS OF PERU

Easy and cheap transportation between her arid coast and the rich natural resources of her highland interior is a prime factor in Peru's economic growth. As long ago as 1848 she built her first railway; now her trans-Andean lines add much to her prosperity.

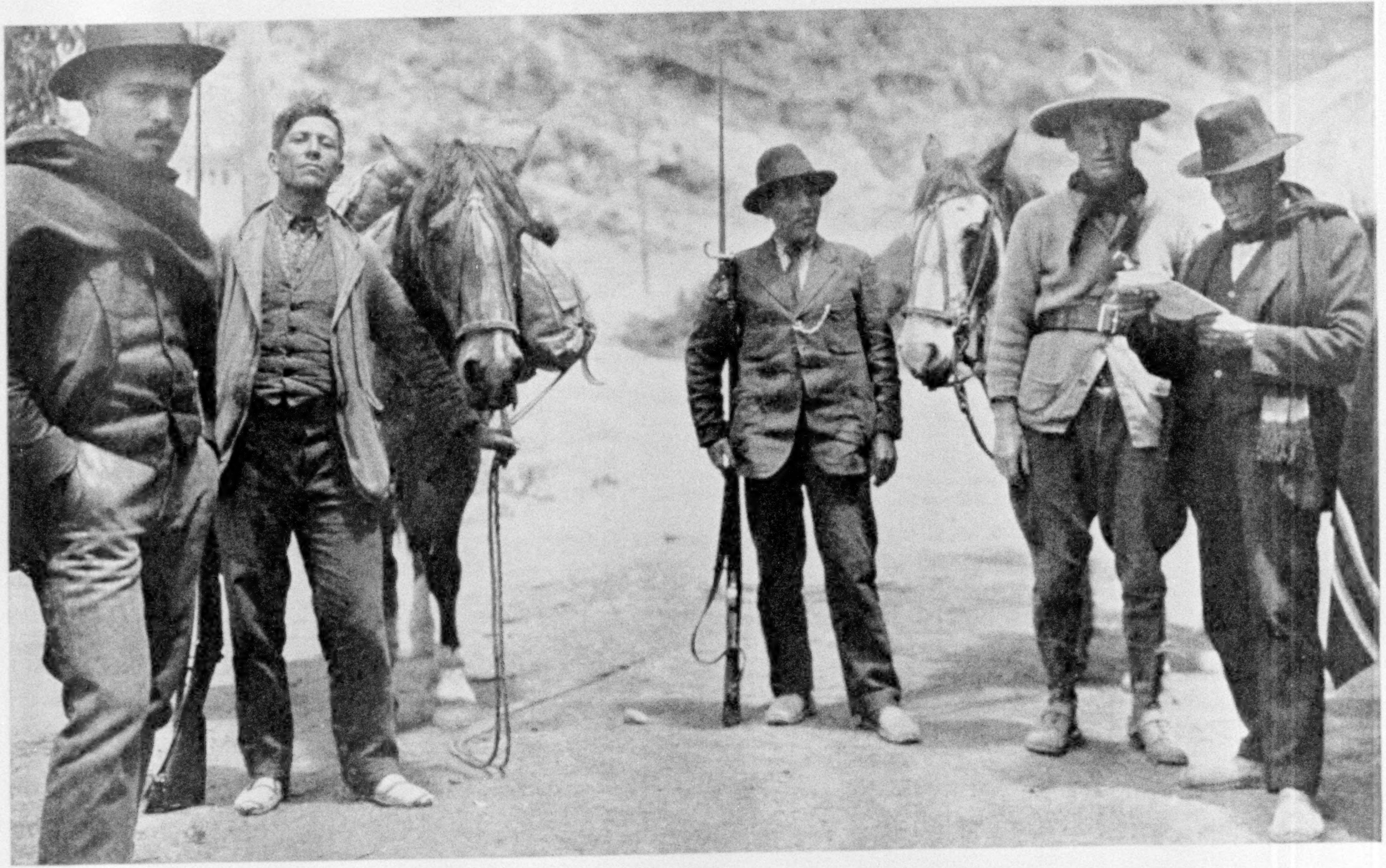


ELECTRICITY LIGHTS PRIMITIVE ECUADORIAN TOWNS

Because of the advent of hydroelectric power, certain remote Latin American towns turned from candlelight to electricity, missing altogether any period of oil-lamp illumination.

PEDDLING PANAMA HATS IN LOWER ECUADOR

The hats are sold unfinished, the buyer trimming off the grassy rim. The best Panama hats are made in the village of Catacaos. Higher-grade hats sell there for as much as $50.

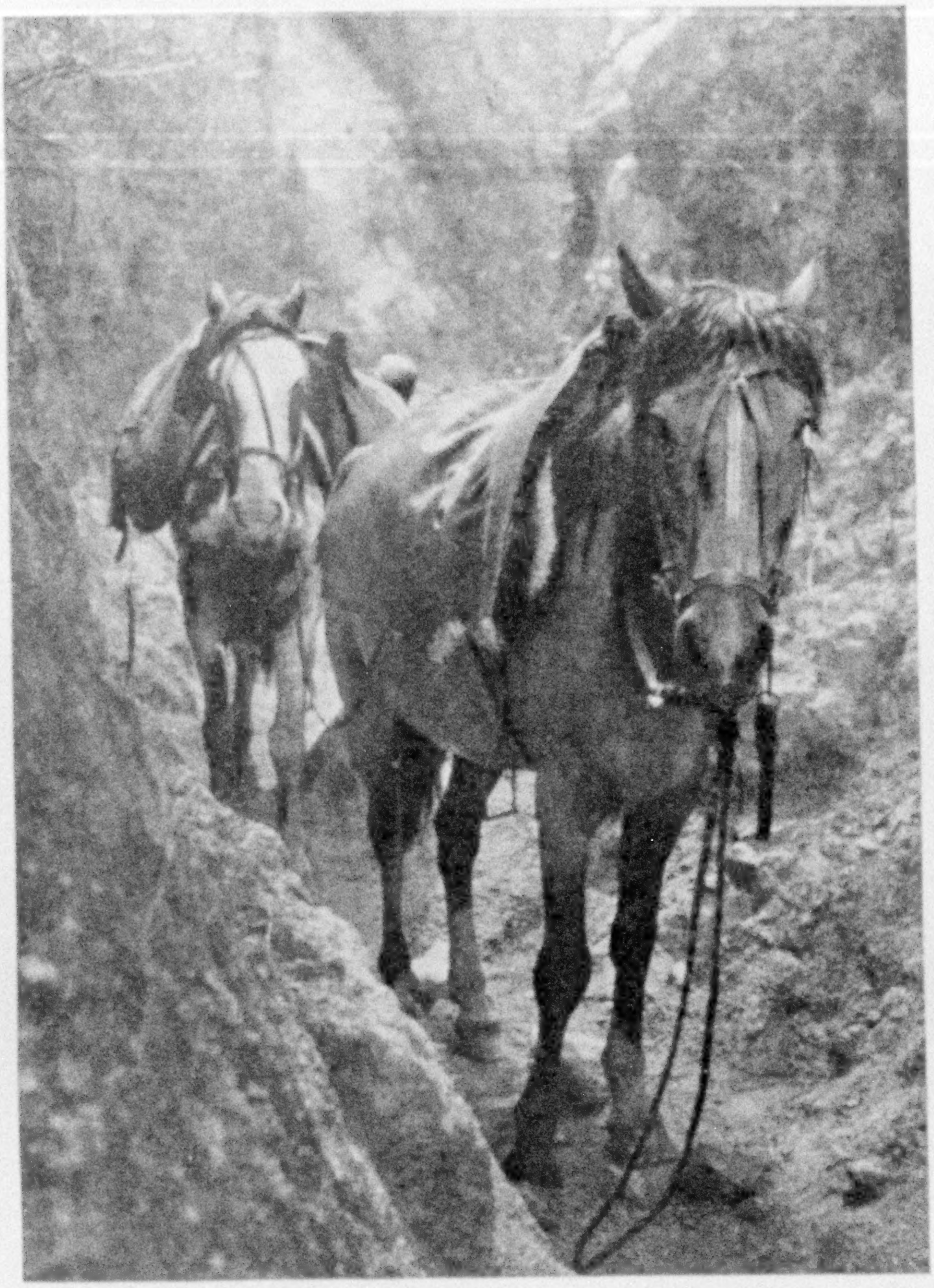


FRONTIER FORMALITIES, CROSSING FROM ECUADOR INTO COLOMBIA

Here the trail crosses the international line over Rumichaca, a natural bridge, where Colombian officials examined the author's documents. At the left, the pack horse, Gato; Mancha, the white-faced horse, stands just behind the author. The Indian boy who was accompanying the author along this stretch of the journey was so shy that he would not allow his photograph to be taken (see, also, text, page 178).

AT THE PUBLIC MARKETS ALL CLASSES MEET ON A COMMON FOOTING

In the quest for food, peons and the well-to-do rub elbows and a spirit of true democracy rules. This is a Colombian village near the border of Ecuador.



HOW HILL TRAILS WASH AND WEAR IN SOUTHERN COLOMBIA

Despite its obviously bad condition, this narrow, crooked path is much traveled, being the only route through this region. In any plan for a Pan-American highway system (see page 140), much country of this nature must be involved.

Quito our trail passed near the famous Cotopaxi, a snow-covered volcano of singular beauty, towering high in a clear blue sky.

FROM INTERESTING QUITO TO THE COLOMBIAN BORDER

We came easily to Quito, one of the most interesting cities on our long march of nearly 10,000 miles. For three weeks we enjoyed its bright sunshine and ideal climate. My horses munched alfalfa in a field three miles out of town.

Then we started north once more, for Colombia. A railroad to connect Quito with the Colombian border was undertaken once, but it has been abandoned. We followed this unfinished track at times, here and there making short cuts, and occasionally encountering deep valleys.

We finally crossed into Colombia over a natural bridge called *Rumichaca* (Stone Bridge). Customs officers stopped us at the line. I had to show my documents. But, as in most other countries, they had been advised of my arrival and treated me with courtesy (page 176).

From there to Pasto a good road has recently been made; but there are many long and tiring climbs, over broken country. Large villages in this region have no running water systems. There usually is a little stream, called an *acequia*, down the main street. It is used for watering animals, washing clothes and dishes, and to carry rubbish away. At the same time, it is not uncommon to see people fill their water jugs or to drink from these acequias.

Colombia has few railroads, because it is very mountainous and the general topography is such that construction would be very expensive. Between the Ecuadorian border and the Cauca Valley trails provide practically the only means of communication, with here and there a short stretch of road.

Between Pasto and Popayán there is the hot Patía Valley, its chief inhabitants being a few Negroes.

Lepers here are numerous. I shall never forget an elderly Negro who crawled out of his hut, his face blotched with disease. This apelike being came right up to me

and held out his hand, begging for money. He even touched one of my horses. Later, I took the precaution of disinfecting the animal thoroughly where the old man had touched him.

HUGE PLANT LEAVES UNFOLD AT AMAZING SPEED IN THE TROPICAL RAINY SEASONS

A dense, verdant mat of ferns, vines, and giant "elephant ears" covers the earth in Colombian jungle regions.

"EL GUENDE," THE MOUNTAIN DWARF, RIDES THE AUTHOR'S HORSE

One morning when I brought the horses in from pasture I noticed that one had a plaited mane. I tried to undo it, but found it tightly knotted. I asked my boy, Victor, if he knew anything about this or if he had done it. He immediately told me El Guende had been with the horses during the night. I had never heard this name and asked for an explanation. In the meantime the half-caste Indian with whom I had spent the night had come up and assured me the boy was right.

It appears that El Guende, according to these people, is a dwarf who lives in deep canyons and desolate valleys, where he can often be heard crying like a baby; or, when he is in a boisterous mood, making noises rivaling thunder. Natives firmly believe that this dwarf is very fond of horseback riding; but, being so small, he is unable to sit on the horse's back, so he sits on the animal's neck, making stirrups by plaiting the mane in such a way as to be able to put his feet in it.

The only explanation I can give for this extraordinary plaiting is the dampness in the air, that may twist the hair around in such a way as to form these knots; or maybe the horse does it when he rubs against a tree.

Popayán is one of the quaintest little towns in all Colombia. Parks and gardens reflect the good taste of the inhabitants, and the old houses are built in Spanish colonial style.

Near by is the Río Vinagre (Vinegar River), the water of which has a very acid flavor. No fish live in these waters. The vinegar taste is attributed to the fact that the river flows past a near-by volcano that abounds in sulphur.

The Cauca Valley is very hot, but is known as the most fertile in Colombia. A railway runs most of its length and there is a good road until, farther north, one comes once more into mountainous regions.

MANCHA AND GATO STAND HEAD TO TAIL, FIGHTING FLIES OFF EACH OTHER

Amid underbrush and cactus, a pause is made for midday rest in a hot valley of southern Colombia. In many regions the horses could forage for themselves; elsewhere horse feed was hard to find. Despite heat, the author often wore a wool sweater in the Tropics, to ward off mosquitoes and because it tore on brush less readily than a shirt.

I had to go to the capital, Bogotá, but as I did not wish to make the horses do an unnecessary trip over mountains and back, I left them to the north of the Cauca Valley, with Victor.

On my return I found the horses in excellent condition and, without losing time, saddled up and started north, the rainy season being due.

DOWN THE MAGDALENA BY BOAT

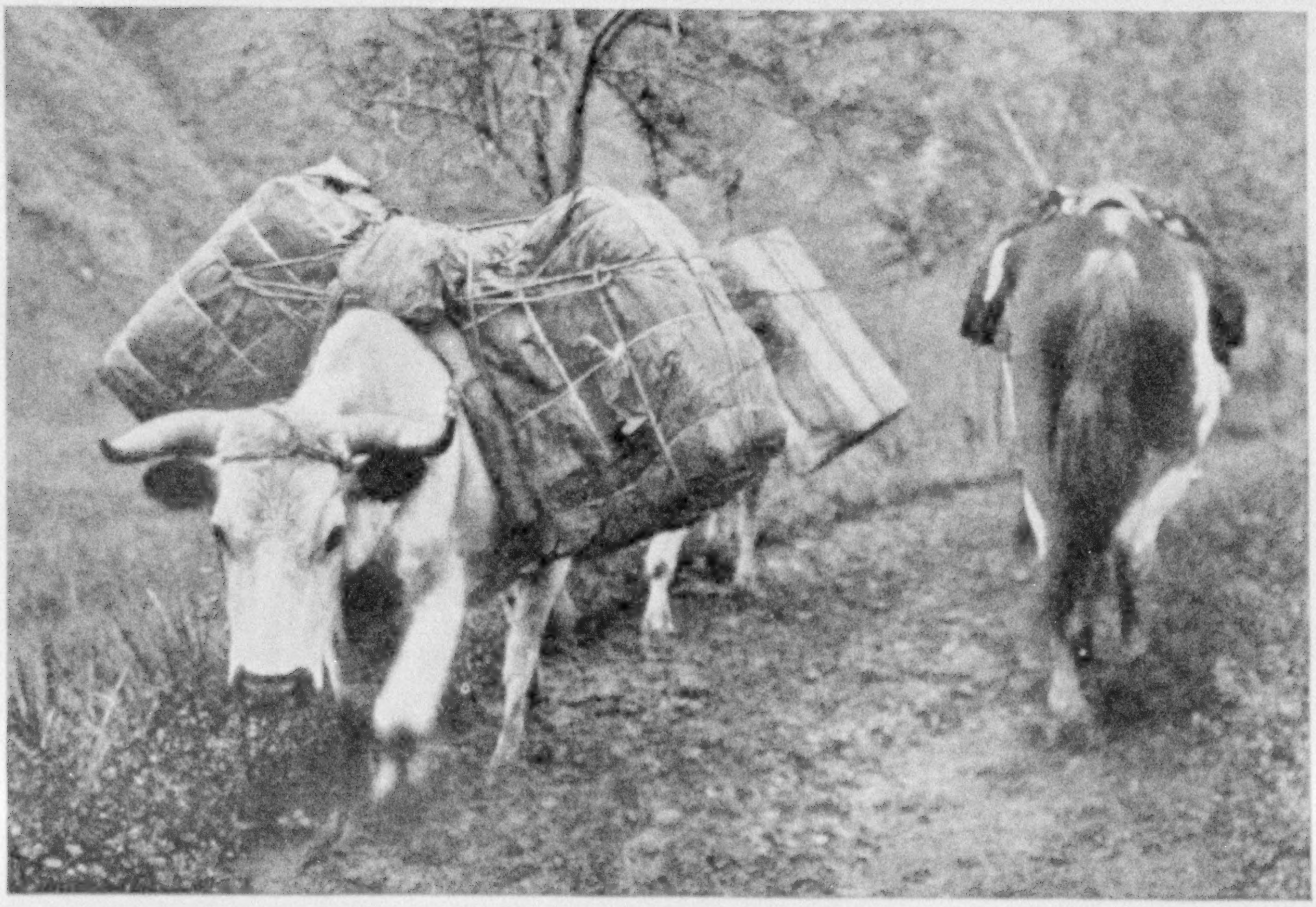
We passed Manizales, which had recently burned. Then, after many hard days of traveling, we reached Medellín, a pretty commercial town in the north of the Republic. Already warned that I could not penetrate the regions still farther north, I went to Puerto Berrio, a small port on the Magdalena River, and there waited for a boat to Cartagena.

The boats on the Magdalena River resemble the old Mississippi stern-wheelers. My horses rode on a flat barge lashed alongside the steamer. I am certain they suffered more while traveling in this way than ever they had done on the march. The broiling sun beat down on the low tin roof of the barge, while they stood in a little space between coffee sacks and got practically no air. Every now and again I would throw a bucket of water over them to cool them off. Also, I covered the tin roof with coarse grass, which I would cut at night when the boat tied to the side of the bank for wood, the only fuel used on these vessels. The Magdalena steamers never travel at night, but tie to the banks and wait for daylight.

After a trying trip, we reached Cartagena and from there took a ship to Colón.

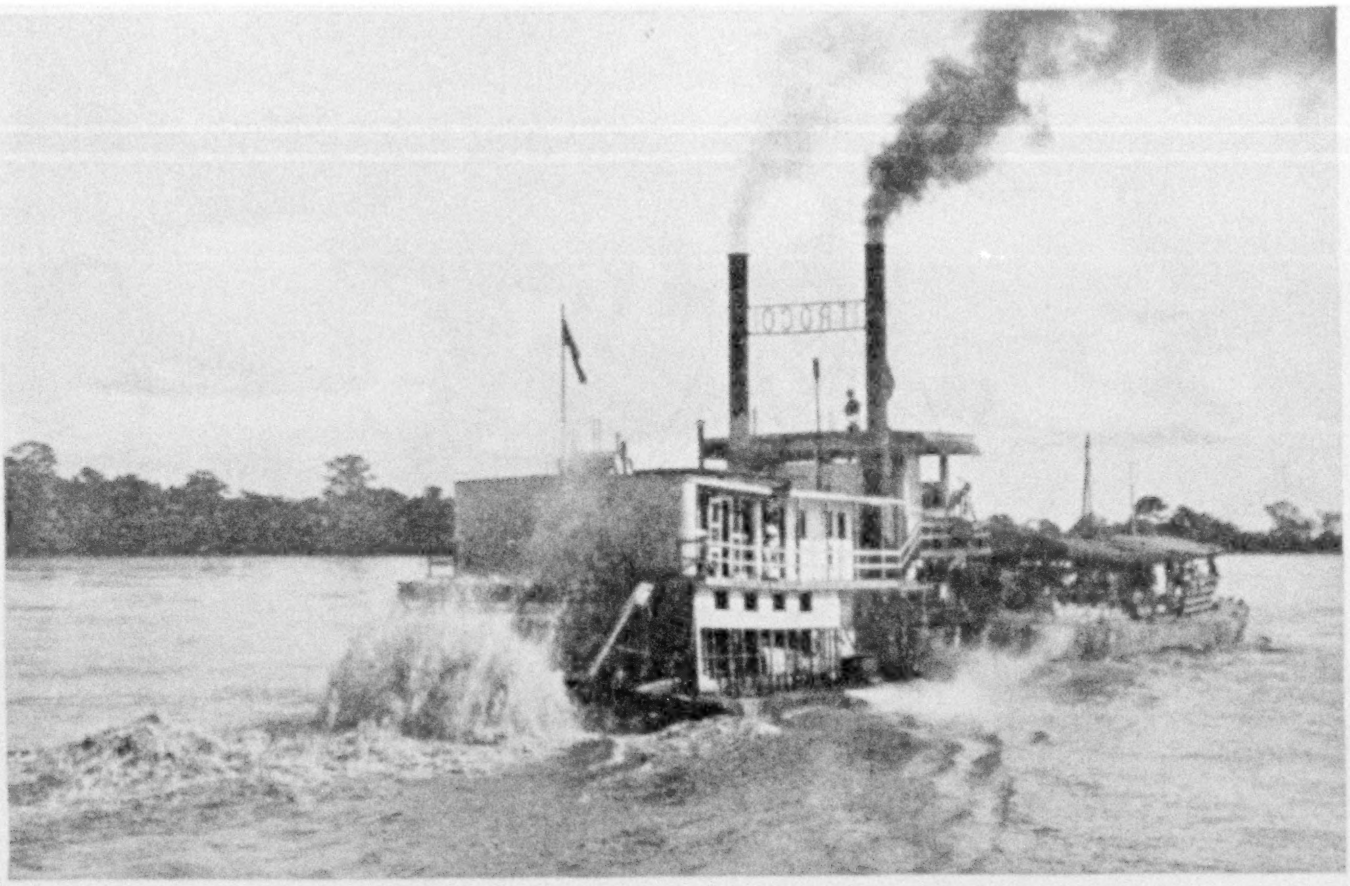
MUCH OF SOUTH AMERICA'S INLAND FREIGHT IS BORNE ON THE BACKS OF MEN AND ANIMALS

A pack train in Colombia passes the author's outfit. In the background, riding uptrail, is the Indian boy Victor, who accompanied the author from Ecuador to Panama (see text, page 170).



THE AUTHOR'S HORSE, MANCHA, MEETS A PACK OX ON A COLOMBIAN TRAIL

The ox can carry a much heavier burden than does the pack mule. On trails which are often muddy, the former is also steadier than the mule and slips less.



MISSISSIPPI TYPES OF STERN-WHEELERS PLY THE MAGDALENA RIVER IN COLOMBIA

These wood-burning boats run by day and tie up at night along the bank. Travelers carry their own bedclothes and mosquito nets. Mancha and Gato rode on the barge, lashed alongside (see text, page 180).

IN THE MAIN CRATER OF GALERAS VOLCANO, NEAR PASTO, COLOMBIA

Soon after this picture was taken there was a sudden discharge of sulphur fumes from a small crater within the large crater, which forced the author to cover his nose and mouth and lie down on the ground. Luckily, a breeze soon cleared the air. This crater is about 9,000 feet above the sea.

OVER STEEP MOUNTAIN TRAILS AND THROUGH JUNGLES THE PACK WAS KEPT AT AN IRREDUCIBLE MINIMUM

True to South American rural custom, the author carried his own padlock for securing his room in village inns at night. It is seen fastened to the pack horse's side.

I had often warned Victor about drinking water out of any ditch or stream we came to. For his own good, I even gave him a good hiding on one or two occasions, when I caught him at it. But he had a bad habit of sneaking away when he was thirsty and drinking without my permission. The result was that he contracted typhoid fever and the mosquitoes of the hot Magdalena Valley induced a serious attack of malaria. He arrived in Panama very ill and was obliged to go to a hospital.

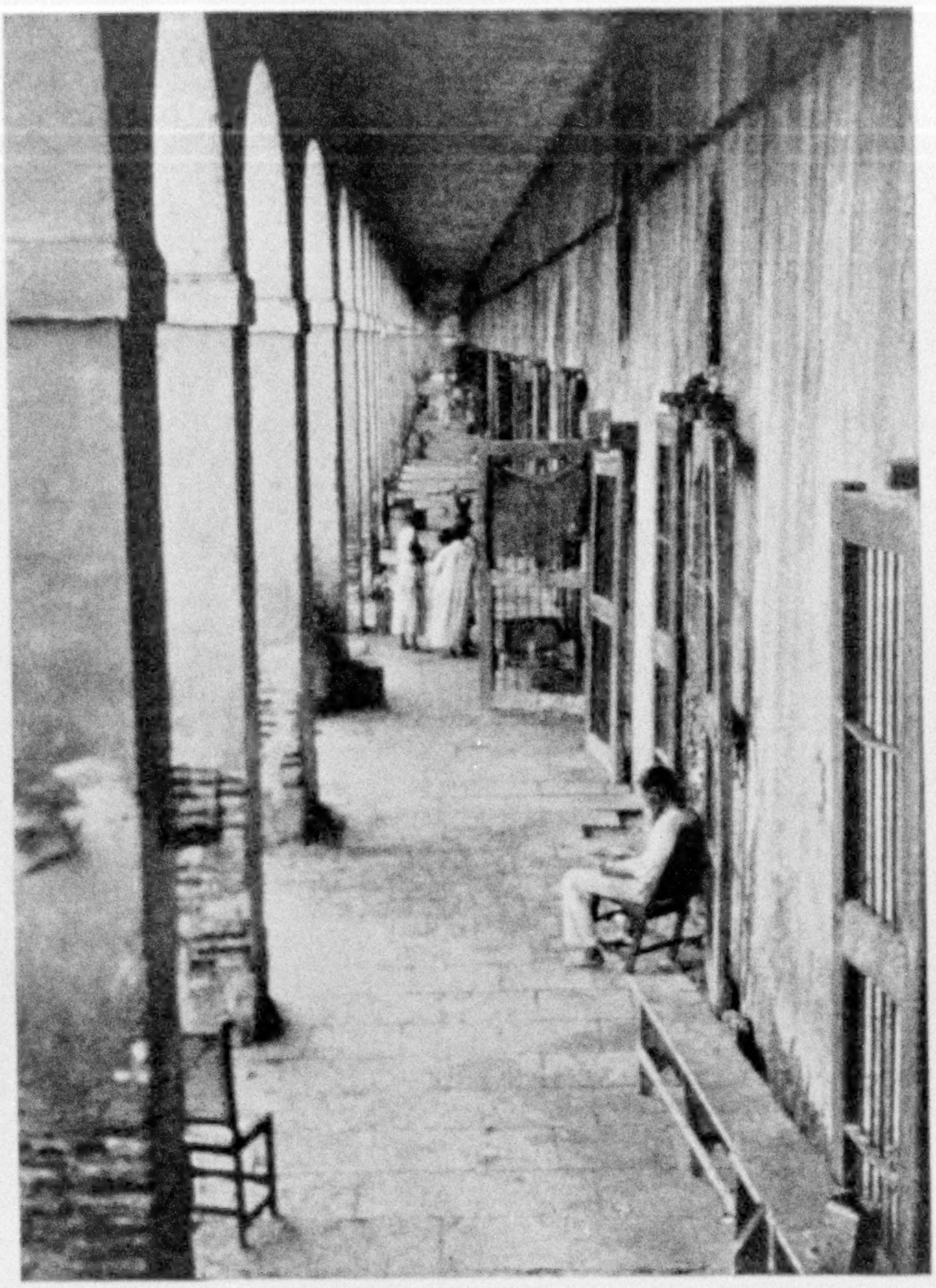
By the time I was ready to proceed he had recovered somewhat, but the doctor considered him unfit to travel; and, as I feared he would not be able to stand the hardships of the jungles and the hot climate, to which he was unaccustomed (having been born and raised in the highlands of Ecuador), I decided to leave him in the Canal Zone. A friend of mine kindly gave him work, and now he has an opportunity to make a good start in life. But I shall never forget the way the boy expressed his sorrow when I left him. He had become desperately fond of my horses, especially of Mancha, whom he would pet and fondle all day.

The rainy season was in full swing, and I had to wait in the Canal Zone until it would be possible to proceed into the interior of Panama. I also had to obtain information about the trails leading to Costa Rica.

THROUGH THE JUNGLES OF PANAMA

Toward the end of January, when the jungles were supposed to have dried up sufficiently, after the long and heavy Panama rainy season, I started north once more.

There is a very good road into the interior of the Panama Republic as far as Santiago; but, unfortunately, in many places it was difficult to find fodder; also, the horses and I were at times literally covered with wood ticks and other insects. I found that a mixture of vaseline, sulphur, and camphor lightly applied to the coats of the horses, especially on the legs, gave excellent results, and I sponged myself every night with creosote diluted with water.



TO-DAY THE POOR OF CARTAGENA INHABIT THESE QUARTERS—A DUNGEON OF LONG AGO

Pirates and buccaneers left their mark on the massive walls and forts of this old port, from which Spain used to ship much of the New World's wealth back home.

After Santiago, one travels over a narrow trail winding through forest and jungle. Twisted roots and mud made it very dangerous for the horses. They might easily have caught a foot in this veritable network of roots and broken a leg. So progress was slow. Mosquitoes added to our torment. But, as always on my long ride, things happened which took my mind off my troubles. In the jungle now I saw occasional herds of wild pigs, and chattering monkey troops up on the roof of the forest.* Beautifully colored butterflies fluttered in and out, especially in forest clearings, and many humming birds darted among the flowers.

SNAKES WERE SCARCE, BUT VAMPIRE BATS FLOURISHED

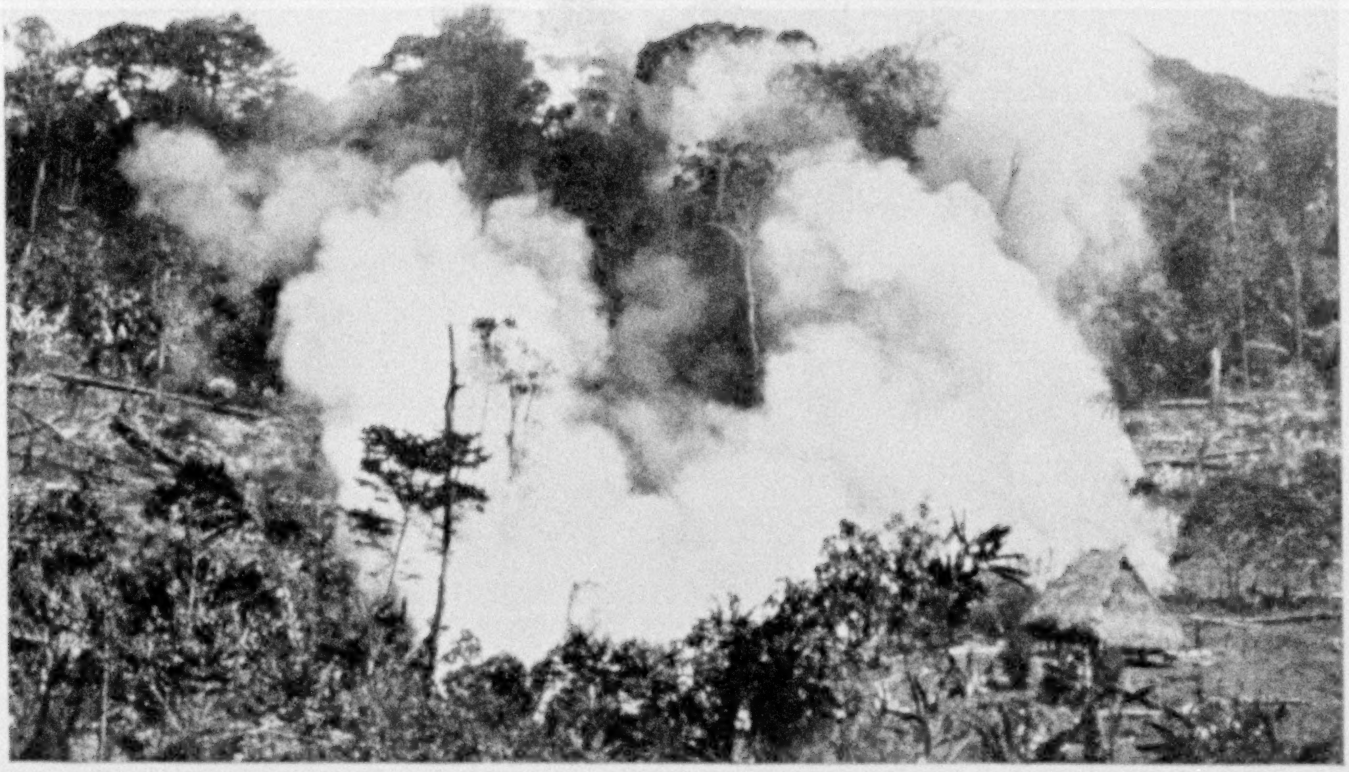
The stories I had heard about snakes must have been exaggerations. On the whole trip I had very little trouble with them. Possibly the heavy steps of the horses frightened these reptiles away before I reached them.

Some of the South American Indians, particularly the Paraguayans, wear around their ankles feathers, which are often thought to be a decoration. In reality these feathers have a very different use. The Indians wear them whenever they go out into the forest or along the narrow trails. They claim that should a snake strike at them, it will never hit the leg but strike at the anklet of feathers.

I had a Colombian remedy with me, effective in case of snake bite. It is called *curarina*. Later I presented my last bottle to a sheriff in Texas.

I did have trouble with vampire bats, however. In deep, warm valleys, from the north of Argentina to the north of Ecuador, the horses were often bitten at night by these blood-sucking creatures. In the morning blood would still be running from the wounds. It appears that animals do not feel these vampires at all, but the loss of blood makes them very thin if they are bitten several nights in succession. These pests can be discouraged by sprinkling strong Indian pepper on the horses and painting them over with creosote and camphor mixed with garlic.

* See, also, "To Bogotá and Back by Air," by Col. Charles A. Lindbergh, in the National Geographic Magazine for May, 1928.



CLEARING JUNGLE NEAR THE PANAMA-COSTA RICA BORDER

Trees are cut, burnt and land planted to beans, bananas, and sometimes rice. This frontier is surveyed, but not marked; so the jungle traveler cannot readily tell when he crosses the line.

Often I covered the horses with blankets to protect them against bats, but with the terrible heat this added to their suffering and they usually rolled to try to get them off.

SAVED FROM CROCODILES

I knew that travel in the region near the Costa Rican border would be difficult, as in many parts there are no trails. Luckily, in a Panama village near the frontier I found a guide to help me through as far as San José.

He was a little half-caste Indian 50 years old. He told me he had done this trip 20 years before, but could remember little about it, except that he doubted whether horses could reach the other side. He was not at all keen on going until I offered him very high pay and a substantial present should we reach the Costa Rican capital safely.

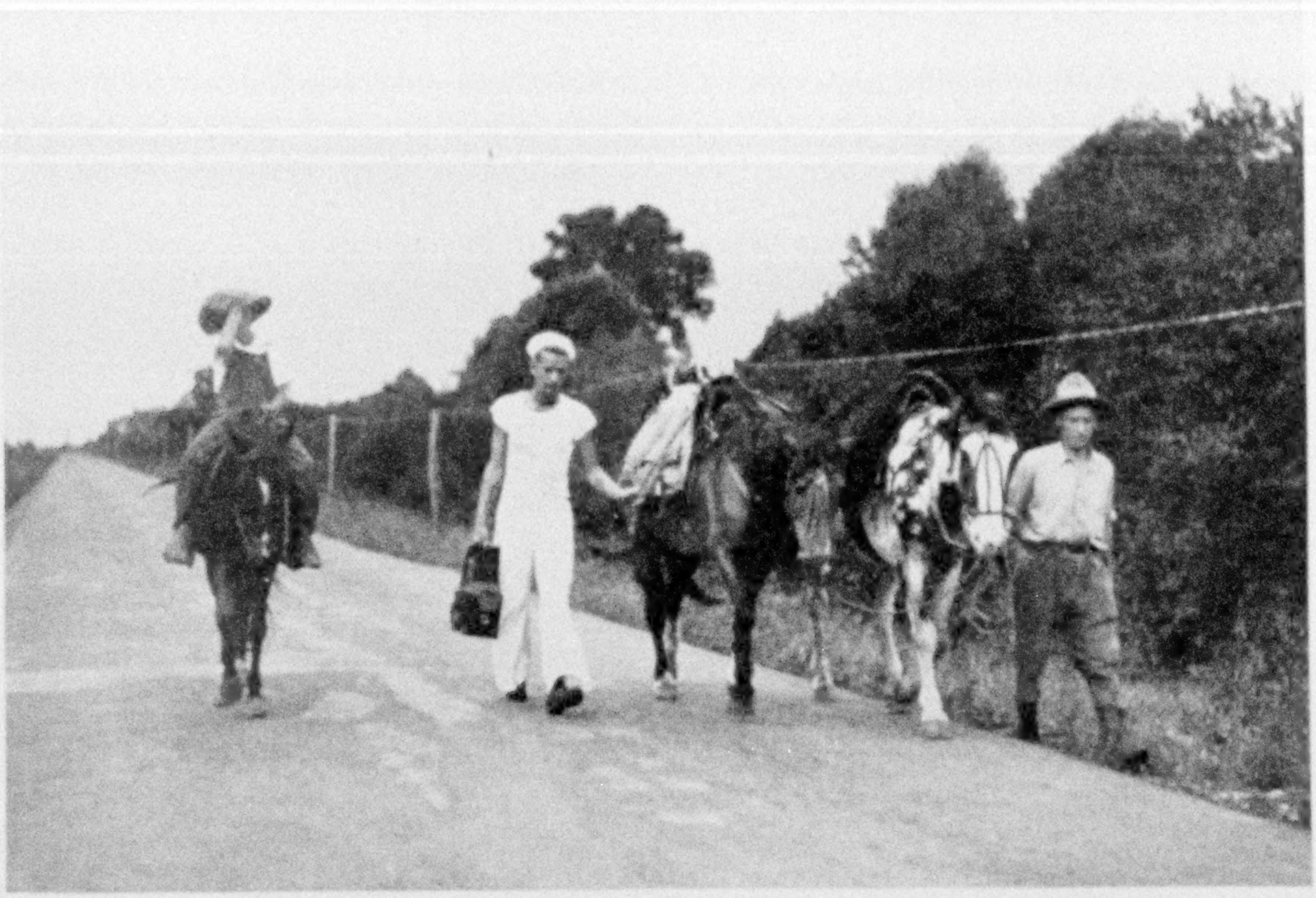
As things turned out, this guide on one occasion saved my life. When I was about to plunge into a beautiful pool, to have a swim, he, at the last moment, shouted, "*Lagartos*" (crocodiles)!

Needless to say, I did not dive in. Upon looking around the edges of that pool, I could see two or three dark shapes, like big logs, just under the water. I took my revolver, that was lying with my clothes, and shot at the biggest one of them. In an instant what had been a beautiful, still pool was transformed into a bubbling, foaming flood, the wounded crocodile lashing about madly until he made a dive to the bottom.

Next morning the guide went back to the pool to see if he could find the dead "croc." He returned with a tin pail full of *grasa de lagarto* (crocodile fat), which is used as a cure for rheumatism, sore throat, cuts—in fact, for almost every human complaint—as *grasa de potro* (horse's fat) is used in the pampas of Argentina.

Chiriquí Indians inhabit these parts. They are peaceful and often work on plantations in Panama. Most of them file their teeth to sharp points, which they claim helps to preserve them for a long time. Looking at the Chiriquis, with their filed teeth and faces painted green, one might take them for cannibals; but they are quite harmless.

To reach San José we had to cross numerous rivers in Costa Rica, and its conti-



AN EXCELLENT SPECIMEN OF AMERICAN-BUILT HIGHWAY THROUGH A CANAL ZONE SWAMP

An American boy (mounted) and a sailor came out to photograph the author and his horses, after his visit of courtesy at the Coco Solo Naval Station.

nental divide was one of the hardest climbs on the whole trip. In parts it is stony, but in many places the ground is soft and slippery, like soap, and the vegetation is very dense. Up on the highest ridge it is bitterly cold, and the traveler has to provide himself with food for several days, as nobody lives there. In fact, from the Panama border almost to San José there is practically no inhabited region. Here and there one may see a miserable hut, but even at these widely separated habitations food is very scarce.

NECESSITY PRESCRIBES MONKEY-MEAT DIET

Despite popular belief to the contrary, food is not always plentiful and easy to find in the Tropics. I shot some wild turkeys in the Costa Rican highlands and now and then a wild pig, but for two days I was obliged to eat monkey meat, stewed with beans and yucca root.

Only two days before we reached San José the rainy season set in. That was luck. Had the rains overtaken us in the interior, I doubt whether the horses could have got out alive, as the Costa Rican rivers and streams are numerous and impossible to cross when in flood.

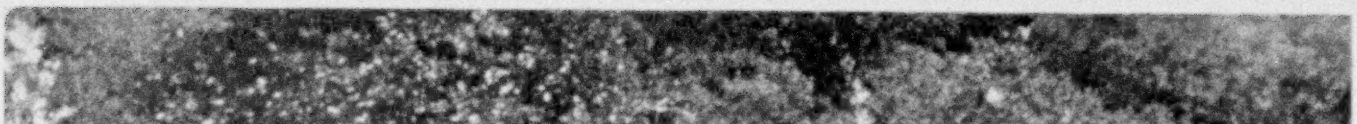
San José, capital of Costa Rica, gave me a cordial reception. I rested there three weeks. My old guide returned to Panama by ship, with many presents from Government officials and other people, who admired him for the way he had stuck to his job. As things go among his people, he returned home a rich man.

I found San José a pleasant town, mild of climate. Government and army officials treated me with every courtesy. I enjoyed my stay. In the town square or park, society gathers in the evenings and the band plays. One evening I noticed the crowds strolling in a circle about the park, and, seeing a gap in a group, I took advantage and walked there; but I soon noticed that most of the men loitering about or watching the passers-by had begun staring at me.

I grew uncomfortable, but didn't know what was wrong. Luckily, an acquaintance saw my predicament and beckoned to me. He explained that I was walking in the wrong direction, or, in other words, that

FERRYING MANCHA ACROSS A RIVER IN SALVADOR

This is the only stream where a ferry was used for the horses; when bridges failed they swam. So many streams were crossed on the long march that the animals eventually became excellent swimmers.



OFFICIAL RESIDENCE OF A GUARD ON THE PANAMA-COSTA RICA FRONTIER

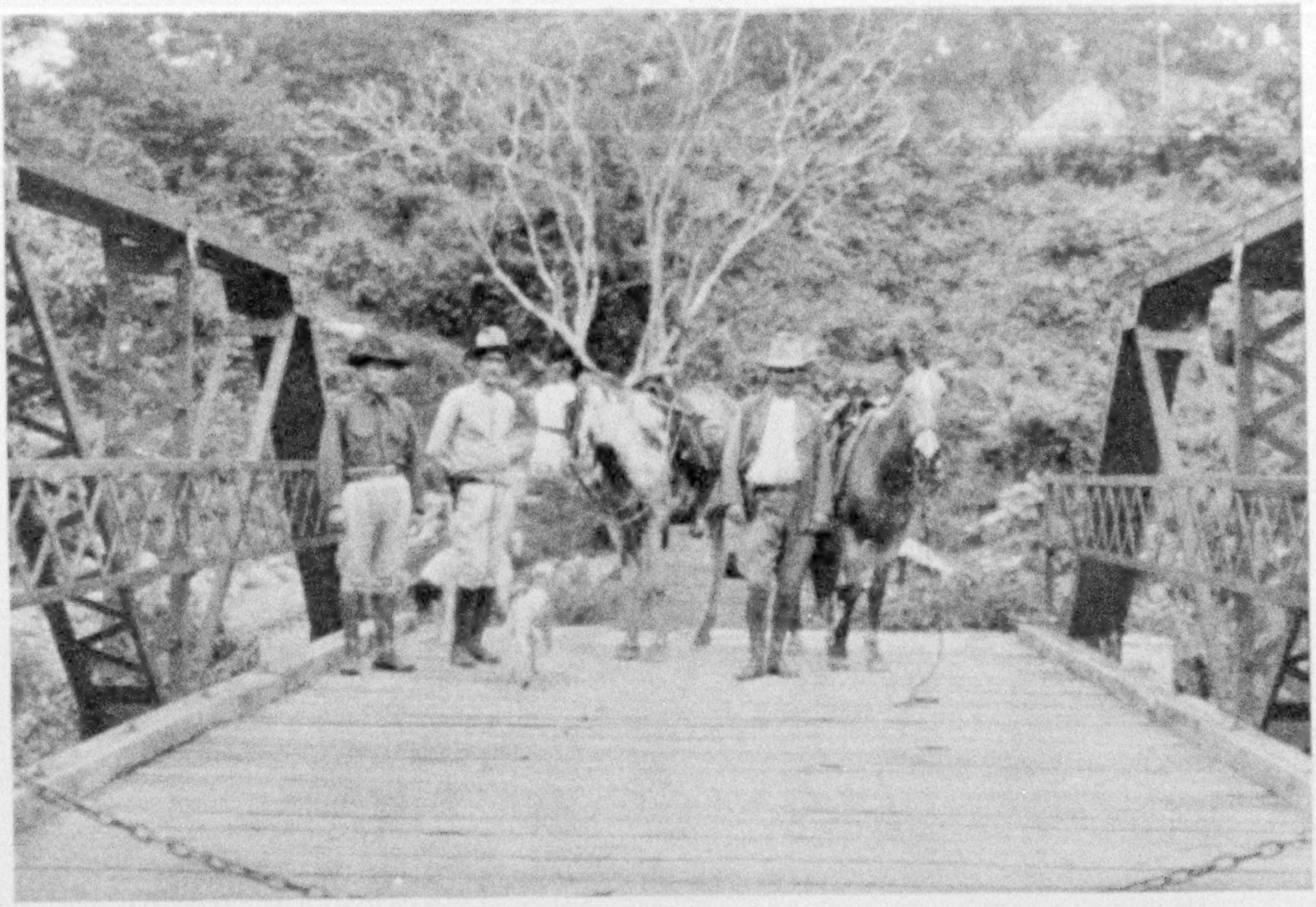
The incumbent, an English-speaking Barbados Negro, numbers among his duties those of local chief of police and customs administrator. Tobacco drying on a string.

MORE THAN ONE-THIRD OF ALL THE POPULATION OF CENTRAL AMERICA LIVES IN GUATEMALA

With good climate, high birth rate, and little emigration, population steadily grows. About 60 per cent of the people are pure Indians. An Indian religious procession through a village on Lake Atitlán, Guatemala.

ANTIGUA THE SERENE FLOURISHED LONG BEFORE PETER MINUIT BOUGHT MANHATTAN ISLAND FROM THE INDIANS

From this old capital of Guatemala, Spain's governors supplanted much of the older civilization of the earlier Americans. Later, earthquakes laid its splendor low. To-day the ruins of its century-old churches lie on every hand, and the splendid patios, once the centers of stately buildings, are occupied by shops and markets (see "Guatemala: Land of Volcanoes and Progress," in the NATIONAL GEOGRAPHIC MAGAZINE for November, 1926).



ENTERING MEXICO FROM GUATEMALA

Here the Rio Suchiate forms the border between the two republics, the chain across the bridge, seen low in the foreground, marking the "line."

I was using the ladies' course. Men, it appears, move one way and ladies the other, so as to get a better view of each other. I had committed the blunder of walking around with the ladies, which simply isn't done.

NICARAGUA IS SKIPPED

Prospects for crossing Nicaragua were none too rosy. There was revolution. Everybody advised me not to attempt the trip, lest I lose my horses or more. Against my will, therefore, I was forced to go to Puntarenas, where I took ship to La Unión, in Salvador.

To put my horses aboard ship was no easy task, as vessels for Puntarenas anchor some distance out. I had to put the animals in crates built for the purpose, load them on a lighter, and then take them out to the ship and swing them on board. This was a dangerous proceeding, with so many inexpert and excitable half-castes fussing around.

La Unión is hot. Years ago a wagon road connected this port with San Salvador, the capital, but since a railroad has been constructed this highway has been neglected and is useless to-day, except as a path for mules and horses. The country is densely populated, and, as in other Latin American regions, my chief delight was to visit the village market places, where the essence of national life can be seen and where I usually bought my food from some stall.

San Salvador was charming enough, but I did not stay there long. I wanted to reach the highlands, where, in better climate, as around Guatemala City, we could rest up for the long march to Mexico and beyond.

A LONG CLIMB TO GUATEMALA CITY

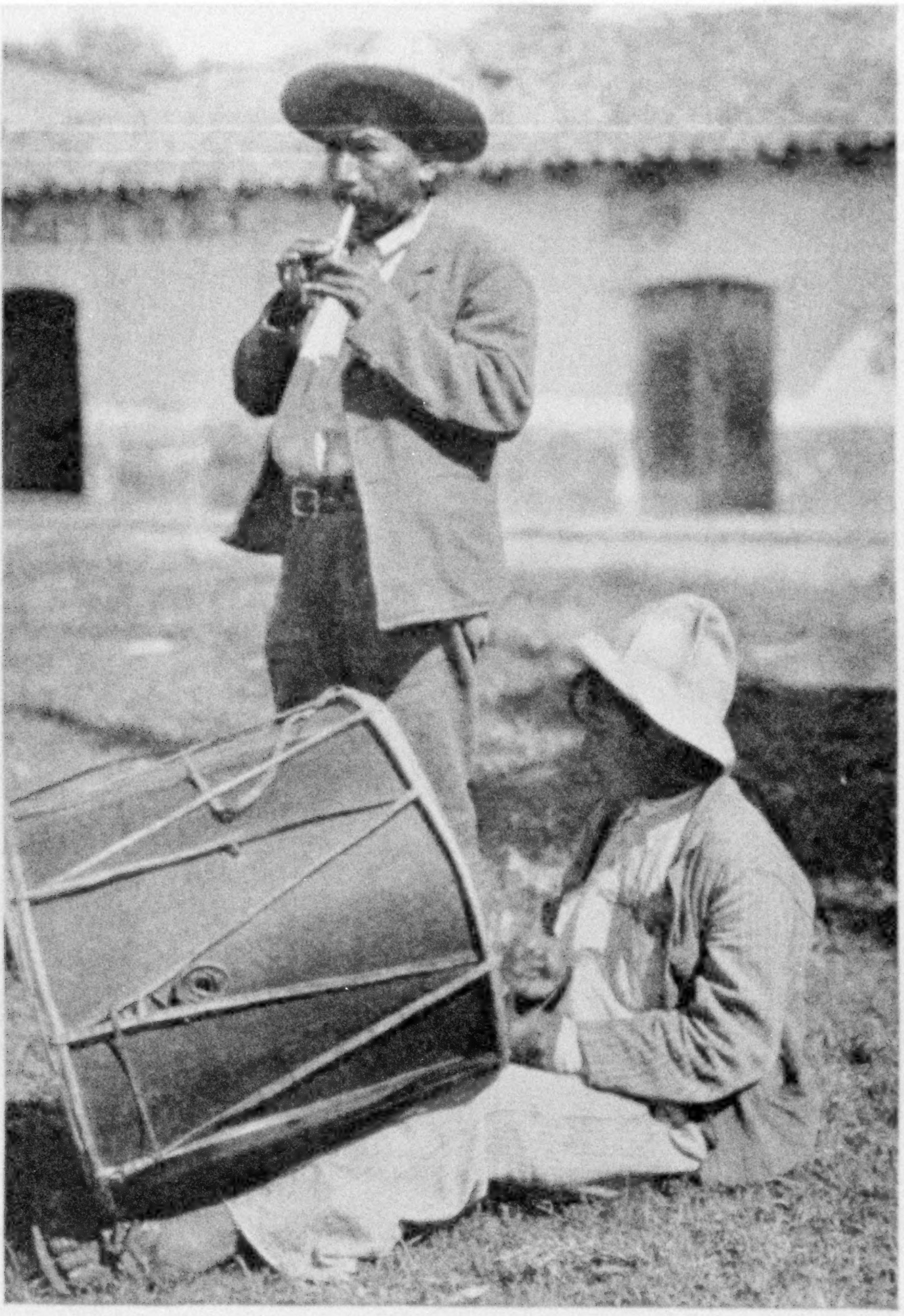
The Guatemalan border was reached without any difficulty. I made a side trip to Coatepeque, a remarkable lagoon, which in reality is the crater of a volcano filled with water. In the distance, behind the ridges bordering this lagoon, one can see the smoke of the famous volcano Izalco. Often it is called the "Lighthouse of Central America," since its bright eruptions

may act as guiding beacons to mariners at sea.*

From the Guatemalan border on to Guatemala City there is a fair road, but many long, steep inclines must be negotiated. During certain times of the year automobiles make this trip, but one wonders how!

Heavy rains fell on my march to Guatemala City. From there I went to Antigua, long ago destroyed by an earthquake, and thence to Lake Atitlán, lying among mountains and volcanoes. Hereabout are many Indian farmers. The climate is very mild and for the first time in years I saw fir trees.

Ahead of me now lay the village of Nahuala. I had been warned to avoid it. It is inhabited exclusively by Indians, who will not tolerate the presence of a white overnight. In most Central American countries the sale of liquor is a State monopoly, but the Indians of Nahuala pay the Government a certain sum each year for not sending alcohol into their village. This sum is about equivalent to what the Government would collect as a liquor tax if Nahuala were not a dry town!



DOING HIS BEST TO MAKE A TINY FLUTE HEARD ABOVE A BIG DRUM

Always the Guatemalan piper plays the same tune on his instrument, which has a thin, shrill note, high as a bird's voice.

There is a very good road in this highland, and I followed it as far as San Marcos, near the Mexican border. In two days down the steep mountain sides, over rocks at first, later through pretty coffee plantations, and finally through tropical vegetation, I reached the bridge spanning the River Suchiate, near Tuxtla Chico. Through the middle of this bridge runs the international line. Mexican authorities at the border had been advised about my arrival and they extended every courtesy (see page 190).

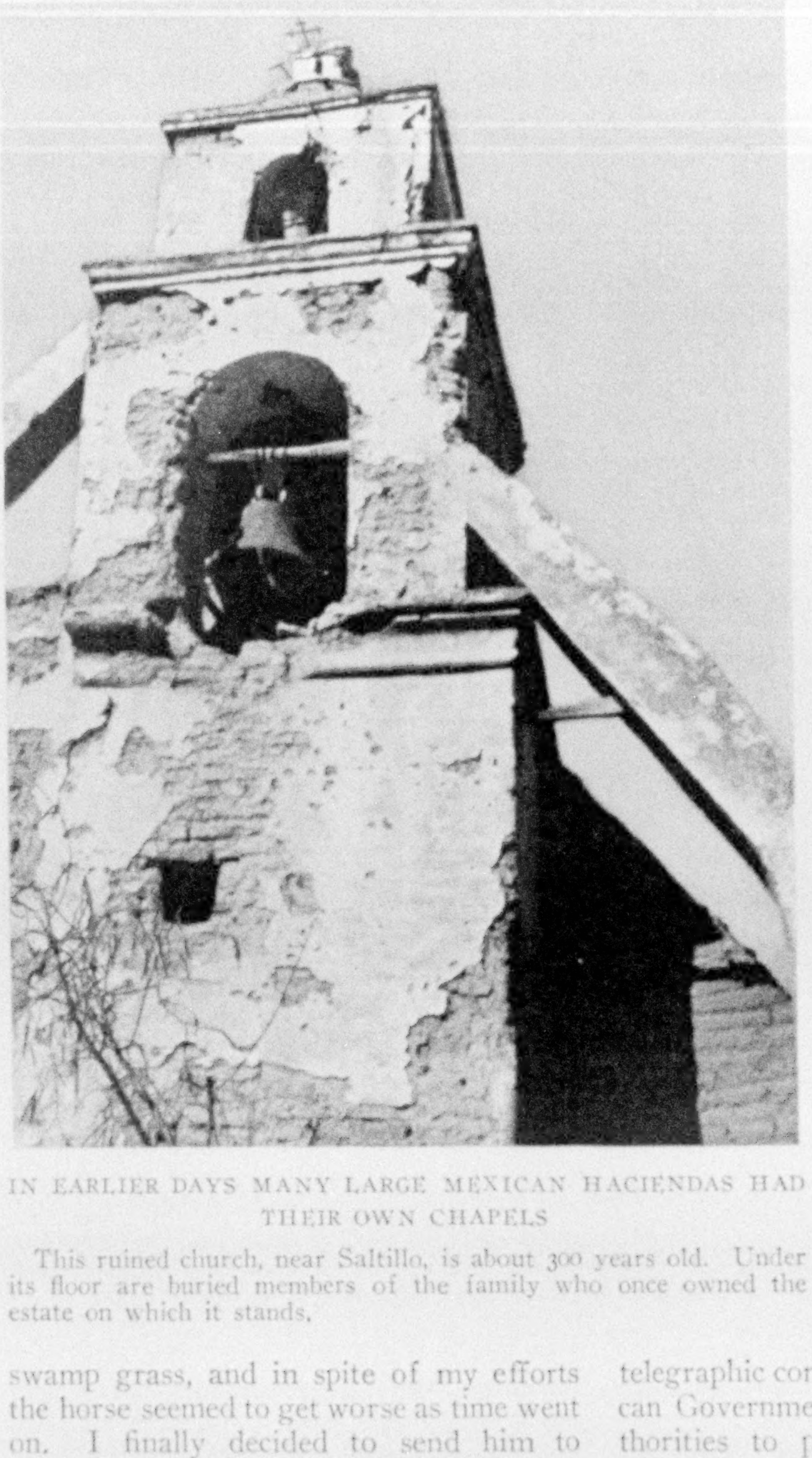
GATO'S ILLNESS CAUSES MONTH'S DELAY

Tapachula is the first Mexican town of any importance beyond the border. Here one of my horses, Gato, had the misfortune to be kicked by a strange mule, and a serious abscess resulted.

I was delayed for a whole month in Tapachula.

The only fodder available was coarse

*See, also, in the NATIONAL GEOGRAPHIC MAGAZINE, "How Latin America Looks from the Air," by Maj. Herbert A. Dargue, October, 1927; "Volcano-girdled Salvador," by Harriet Chalmers Adams, February, 1922, and "Shattered Capitals of Central America," by Herbert J. Spinden, September, 1919.



IN EARLIER DAYS MANY LARGE MEXICAN HACIENDAS HAD THEIR OWN CHAPELS

This ruined church, near Saltillo, is about 300 years old. Under its floor are buried members of the family who once owned the estate on which it stands.

swamp grass, and in spite of my efforts the horse seemed to get worse as time went on. I finally decided to send him to Mexico City by train, where expert veterinarians might possibly save his life. As things turned out, this decision proved wise. When I reached Mexico City one of the reception committee that came out to meet me rode on my old equine friend, who had completely recovered.

Mancha, the other horse, had to carry me all alone for that long and difficult stretch between Tapachula and the capital. After having sent the crippled Gato away, I hired a guide to help me through the swampy regions of the coast of Chiapas.

Horseback travel on this part of the Mexican coast was hard and tiresome. A railroad connects the Isthmus of Tehuantepec with the Guatemalan border; but this line, instead of being of assistance to a person traveling with horses, is in fact a hindrance. Its numerous bridges are so built that horses cannot pass over them, and the many rivers, mud pools, and lagoons that obstruct one's way necessitate frequent unsaddling, swimming, and resaddling. Numerous crocodiles added nothing to the joys of travel.

After no end of trouble, we reached Tonala, halfway between Tapachula and Tehuantepec. I found it full of troops. A revolution had broken out while I was cut off from civilization, where no newspapers had reached me.

The local commanding general told me that numerous bandits were operating in this neighborhood and warned me in strong terms not to proceed. That same night a telegraphic communication from the Mexican Government ordered the military authorities to provide me with a strong armed escort to take me from one garrison to the next (see page 195).

I do not think the soldiers enjoyed the prospect of a journey along the swampy coast. Hardly had we started than I noticed that the type of horse they used was totally unfit for such a journey. They were animals imported from the United States and had never before been in a tropical climate, much less on such a swampy coast as that of Chiapas, where the only kind of fodder available is rough

swamp grass. Several animals died of colic, most of the others were sick, and few showed any aptitude for swimming.

HORSE'S TAIL AIDS SOLDIERS IN CROSSING SWIFT STREAMS

Quite a number of the Mexican soldiers were also unable to swim, and my horse's tail was in great demand where waters were deep or swift, three or four soldiers hanging on for dear life.

I had tasted many strange kinds of food on the journey up, such as monkey meat, wild pig, and even a soup of beans, bananas, yucca root, and monkey; but here I was introduced to a new dish. I had never heard of it before. It was boiled iguana, a large, ugly creature of the lizard family. I must admit that I do not blame the Mexican for considering this dish a special treat, for, in spite of the repulsive appearance of the animal, the meat is excellent, tender, and tasty.

The classical dishes of Mexico, however, are tortillas and frijoles. He who objects to them shouldn't travel in the interior of that country, for there is absolutely nothing else to eat in most places.

We had continuous rains until we reached Tehuantepec,* where I stayed for two or three days.

The women of Tehuantepec enjoy the reputation of being the prettiest in Mexico. Many of them are perfectly white, and I am told that this is due to the crossbreeding of French and Spanish. They are very fond of gold beads and gold coins made into necklaces, and they wear long flowing skirts of many colors.

My intention was to cross the Isthmus toward Puerto Mexico, but, as the center of the revolution was in that neighborhood, I was advised to take the route over the Sierra Madre toward Oaxaca.

The poor trail leads over extremely broken country. Some twenty years ago many prosperous estates existed hereabout; but, with the many revolutions, most of them have disappeared and the others to-day are in ruins.

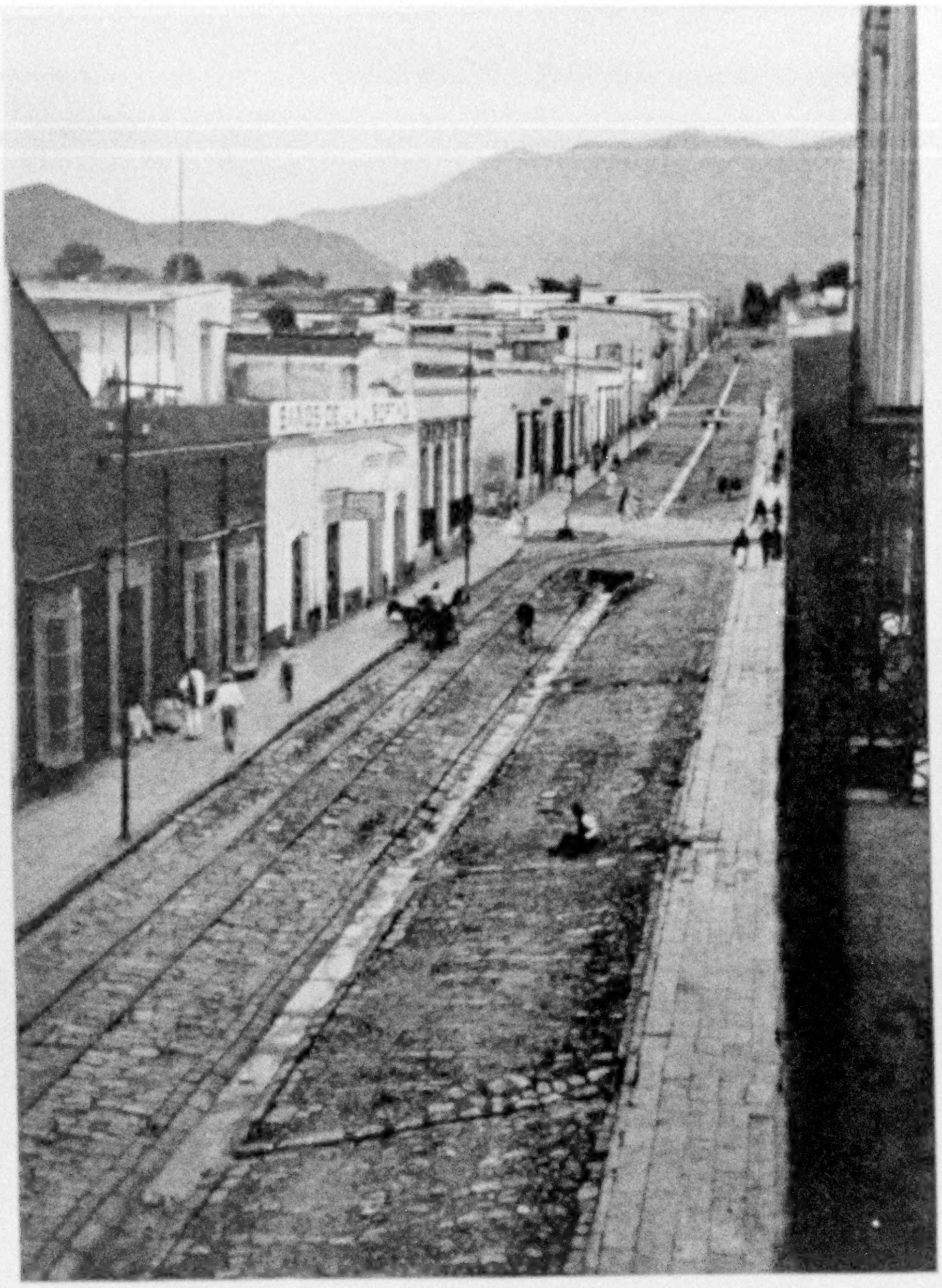
The inhabitants of these mountain regions are mostly Indians. The various tribes speak different languages, yet understand and have a good command of Spanish. I was well received in every village; but, as the natives themselves had very little to offer, I had to put up with a certain amount of discomfort. More than once some kindly village mayor brought me a clean pillow. This made sleeping on a hard floor more comfortable. I could not help but appreciate this courtesy, considering that such a luxury is almost unknown among these people; to this day I wonder where and how those pillows were obtained.

Here bad attacks of malaria worried me. I contracted this illness in Salvador, where I stupidly omitted to take the necessary

A BELLE OF TEHUANTEPEC

Qualities of spirit and courage and sprightliness have made the beauty of the women of this part of Mexico famous for generations. This girl put on her gold necklace when she attended a dance given the author by the authorities.

* See, also, "The Isthmus of Tehuantepec," by Herbert Corey, in the NATIONAL GEOGRAPHIC MAGAZINE for May, 1924.



OAXACA NOW DREAMS OF ITS EVENTFUL PAST

For more than 400 years Oaxaca played a high rôle in the romantic history of conquest and gold mining in Mexico. It has seen vast fortunes won and lost. In recent years it has declined in importance, but even yet hardly a day passes that some family of Indians does not drift in from the bush with raw gold to sell to traders.

precautions, as I had always done hitherto.

Near Oaxaca I visited the remarkable ruins of Mitla.*

The highland of Mexico in those parts is very different from anything I had seen before. Rolling, sandy stretches spread before the eye, with cactus plants growing in abundance. In the distance the snow-covered volcano Orizaba made the most beautiful background imaginable.

The first really important town I reached in Mexico was Puebla, an industrial center and probably the finest city in Mexico, with the exception of the capital and Guadalajara.

AN ENTHUSIASTIC RECEPTION IN MEXICO CITY

An excellent road leading over the mountains to Mexico City has recently been finished. It took me two and a half days to travel this distance, and I shall never forget the wonderful reception I was given on arriving in the capital.

Numerous Mexican *charros,* as gentlemen riders are called, came to meet me some fifteen miles out of town, accompanied by motorcycle police, Government and army officials.

After three weeks of continuous entertainment, I left the capital and proceeded in a northerly direction to San Luis Potosi. From there to Saltillo I more or less followed the railroad line through a wide, flat valley between two mountain ranges. I have often heard the region described as desert; but, after having traveled the coast of Peru, I should hardly call it that—merely barren land, where water is extremely scarce and nothing but shaggy shrubs will grow. This Mexican plain is more or less the same as Santiago del Estero, in Argentina (see text, page 143), which is roughly in latitude 25° S., whereas this Mexican region is in the same latitude north.

I was forced to make some long journeys between villages or miserable haciendas, where I could obtain water and fodder. I encountered severe cold and strong winds, as it was then around Christmas.

* See, also, "Hewers of Stone," by Jeremiah Zimmerman, D. D., LL. D., in the NATIONAL GEOGRAPHIC MAGAZINE for December, 1910.

IN SOUTHERN MEXICO THE AUTHORITIES PROVIDED THE AUTHOR WITH A MILITARY ESCORT

Bandit activities made a guard seem advisable. When these soldiers got tired of walking they commandeered burros from owners along the route. In the thinly peopled Sierra Madre region (see text, page 192).

I was very pleased when I finally reached Saltillo, and from there crossed over a small mountain range to Monterrey, the only town in Mexico where I saw more factory chimneys than church towers. At present a fairly good road connects Monterrey and Laredo, on the border between the United States and Mexico, and motor cars make the trip when there is not too much rain.

Here again the land is extremely barren. I was obliged to spend the nights in poor huts, where goat herders live. Goats seem to be the only animals that can thrive on the scarce vegetation thereabout.

Mexican authorities in Nuevo Laredo, as the town on the Mexican side of the Rio Grande is called, left nothing undone for my comfort. My ride across two continents appealed to their imagination.

DIFFICULTIES OF HORSEBACK TRAVEL IN THE UNITED STATES

After a few days in Nuevo Laredo, I crossed the International Bridge into Laredo, Texas. Here I was cordially received by the colonel of the Fourth U. S. Field Artillery and spent several pleasant days as his guest at Fort McIntosh.

The American civil authorities at the border did all in their power to make things easy for me and to avoid much "red tape," as they so nicely call it.

There is no need to describe my trip through the United States; most of my readers are far better acquainted with conditions here than I am; but it may be of interest to mention my impressions and some of the difficulties I met with—difficulties I never expected to find.

Concrete roads are excellent for motor-car traffic, but they are very tiring and hard on horses; and heavy motor traffic makes horseback riding anything but pleasant.

To-day, also, the problem of stabling horses in American towns is not as simple as it once was. Stables have given way to garages in most villages and towns and sometimes even on farms.

Taken all in all, I believe I enjoyed my trip through Texas and Oklahoma more than through the Eastern States. This may

Photograph by C. O. Buckingham Company

AT THE END OF THE 9,600-MILE RIDE: THE CAPITOL AT WASHINGTON

More than two and a half years after he set out from the National Capital of Argentina, the author arrived, with his original mounts, in the National Capital of the United States. This view of the Capitol was taken from the dome of the Library of Congress on March 4, 1925, during the inauguration of President Coolidge. A similar scene will be enacted next month, at the inauguration of President-elect Hoover.

have been because everything in America was then new to me.

From Laredo, Texas, I went to San Antonio, where I spent three happy weeks at Fort Sam Houston, again as a guest of the Army. From there I passed through Dallas; Muskogee, Oklahoma; St. Louis; Indianapolis; Columbus, Ohio; and then through Cumberland, Maryland, to Washington, D. C.

I had originally intended to finish this long ride in New York City; but, after two fairly serious accidents, when I was run into by reckless automobile drivers, I decided it would be better to finish in Washington, having ridden from capital to capital. I did not feel it sane to expose my horses to further danger and possibly even to lose them. They had already more than proved their worth.

From Washington I shipped both of the horses to New York. Now, as I write this, they are comfortably housed there, awaiting shipment back to Buenos Aires, where they will enjoy a well-earned pension in a public park. While they live, people will point them out—famous specimens of the historic criollo breed—the only horses that ever traversed the Western Hemisphere from Patagonia to the Potomac.

TWIN STARS OF CHILE

Valparaiso, the Gateway, and Santiago, the Capital—Key Cities with a Progressive Present and a Romantic Past

By William Joseph Showalter

Author of "The Panama Canal," "Mexico and Mexicans," "Belgium: the Innocent Bystander," "Partitioned Poland," "The Countries of the Caribbean," "Cuba—the Sugar Mill of the Antilles," etc., etc., in the National Geographic Magazine

LIKE a vast jewel-studded sickle, the long, curved shore line of Valparaiso flashes and twinkles before the traveler sailing into the roadstead after nightfall.

Straight handle and curving blade gleam for miles through the darkness, and in the distance the jewels rise higher and higher until they seem to join the stars of heaven, causing one to wonder where earth ends and sky begins.

In the writer's two decades of wanderings round about the Western World, many a majestic harbor scene has written upon his mind impressions that defy forgetting; the entrance to Havana harbor, bathed in the glory of a tropical midnight moon, with Morro Castle, the Malecón, and a sleeping city beyond; Vera Cruz in the early morning, with its moss-covered dungeons and centuries-old fortresses in the foreground, and in the background snow-crowned old Orizaba, its lower reaches still hidden by the reluctantly retreating darkness, but its summit glorified by the rosy hues of the dawn; the harbor of Rio, where the forenoon fog rises like a Brobdingnagian curtain, revealing a turquoise-watered, island-studded, city-girt, mountain-environed realm of enchantment; the Golden Gate, with its portal hills gilded and bedizened by the descending sun until they seem fair and fit guardians of an entrance to Elysian lands; New York harbor, with its Narrows, its Statue of Liberty, its shipping and its skyline; Kingston, Jamaica, with its reminiscences of Port Royal, Morgan, Rodman, and Drake; St. Thomas, in the Virgin Islands, with its horseshoe bay and its tales of Bluebeard and Captain Kidd.

But, even with the memories of all these, one's heart still beats fast before that jeweled sickle which is Valparaiso on a cloudless, moonless night.

When the morning dawns and its mists are burnt away the explanation of this magic night scene appears.

Out of the distance to the left comes the fine boulevard through Viña del Mar, Chile's summer residential dreamland; its lights formed the sickle's handle. Along the arc of the shore creeps the boulevard and the connecting downtown streets; their lights outlined the curving blade. At distances of from one to six blocks from the beach, high bluffs rise, their precipitous faces occupied by small houses anchored perilously to the rocks, and their heights crowned with the more pretentious structures of the older residential district; the lights along the rocky stairs and walkways of cliffside and height and in the myriad windows of abutting houses were those that seemed to sing with the stars of the night sky.

OTHER CITIES SEEN IN "VALPO"

The gangplank had barely joined dock and deck before a flood of nondescript humanity began to flow aboard; for the existence of Valparaiso's hosts of porters is precarious in the extreme, and they were as hungry as wolves for the pesos that baggage-carrying would bring them.

"Valpo," as the city is called down Chile way, much after our North American fashion of sometimes shortening Philadelphia into "Philly," has reminded many travelers of other cities. The late Lord Bryce, great traveler that he was, found it recalling Spanish and Italian municipalities which glitter on the cliff-bound shores of the Mediterranean, particularly resembling Messina in being very long and extremely narrow, with the cliffs leaving nothing but

a few blocks between their bases and the shore. Others have likened it to Trebizond, on the Black Sea, or have seen bits of Constantinople and Seattle in it.

Here and there steep paths and rock-hewn stairs lead up deep gullies that come down from the heights to the littoral, but with few exceptions they are too steep for aught but the feet of beasts and men.

In the main, communication between the business district below and the older residential district above is by elevator and ascensor, of which there are a dozen or so (see page 220).

PERAMBULATING MEAT MARKETS

The main business street runs close to the foot of the rocky bluffs, and it is rather a striking experience to be walking along with fine banks and stores on either side, and then suddenly come to a cross-street that becomes a rocky stair winding its way up the cliff, or ending at an elevator which rises perpendicularly up the face of the natural wall. Toward the boundaries of the old city, there is one bifurcated ravine through which trolley cars reach to points on the heights.

The houses of the well-to-do on the bluffs are surrounded by narrow, winding streets, and one seldom sees a vehicle here.

The market folk find their way around with panniered donkeys and horses. Here is a perambulating meat market, the dealers' wares being hung on hooks attached to the panniers; there a peripatetic bakery, and yonder a milkman with two cans of milk slung on either side of his horse, each can with a spigot at the bottom, so the milk can be drawn for the customer at the door (see illustration, page 217).

The view of the harbor from the balconies of the cliff dwellers is a striking sight. Scores of ocean vessels ride at anchor, hundreds of small craft ply here and there, and one gets a bird's-eye view of the busy scenes around the wharves, along the water-front streets, and in the business district.

THE EARTHQUAKE OF 1906

One may to-day see the flags of many nations in this most distinctive of West Coast harbors from San Francisco to Punta Arenas. The merchant flags of the United States, Norway, the British Empire, France, Germany, Italy, Holland, Spain, and Japan may be seen floating above the shipping in a single day.

Valparaiso's great earthquake of 1906 did little damage to the houses on the heights, and even those humbler homes, which seem to adhere to the faces of the cliffs as precariously as mud daubers' nests to a wall, went through it unscathed; but when we come down to the alluvial ground of the business district and the crowded tenements, consciousness of the great catastrophe is forced upon us; for the débris in some sections was so great that the city authorities abandoned the idea of its removal and simply piled it into the streets and laid new concrete thereon. Therefore, as one walks along, for blocks the steps go down from the street into the houses—a mute but eloquent reminder of the extent of the damage.

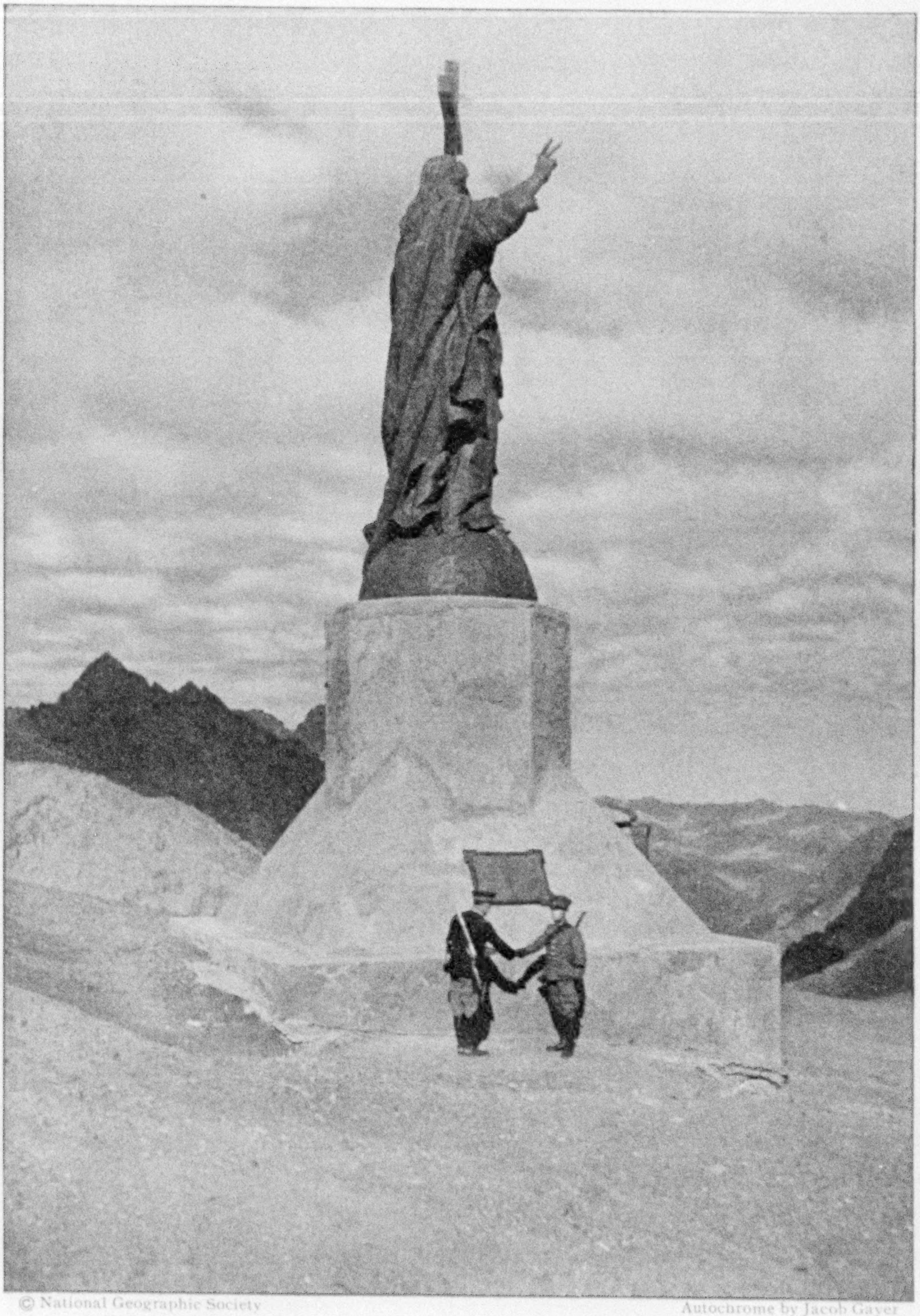
THE BURDENS OF THE PATIENT DONKEY

The transportation problem in Valparaiso is not as acute as in most cities. The heavy hauling is done on streets near the water front, and there is little use for carriages or automobiles in the business district. The streets, therefore, are almost completely given over to trolley cars and busses. Most of the conductors on the cars are women, and a serious-minded, not-too-prepossessing lot they are (see illustration, page 221).

Most of the trolley cars are double-deck vehicles. The fare on top is 10 centavos, the equivalent of 1.2 cents in U. S. currency, and the fare below is 20 centavos. Both men and women, outside the lower classes, will stand jammed like sardines in a box below, rather than go up to the top, where vacant seats are plentiful.

There are a great many busses, and one wonders how the trolley lines can live at the rate of fare the municipality fixes and with the competition they have to meet.

On the streets which parallel the main thoroughfare on the shoreward side, one sees much of native transportation. Trains of donkeys, with their slim bodies hung about with almost every conceivable article, come and go. Some are loaded with wine casks, others with sacks of flour or cement, and still others with long pieces of iron, with furniture, and even perambulators. Boards 16 to 20 feet long are slung



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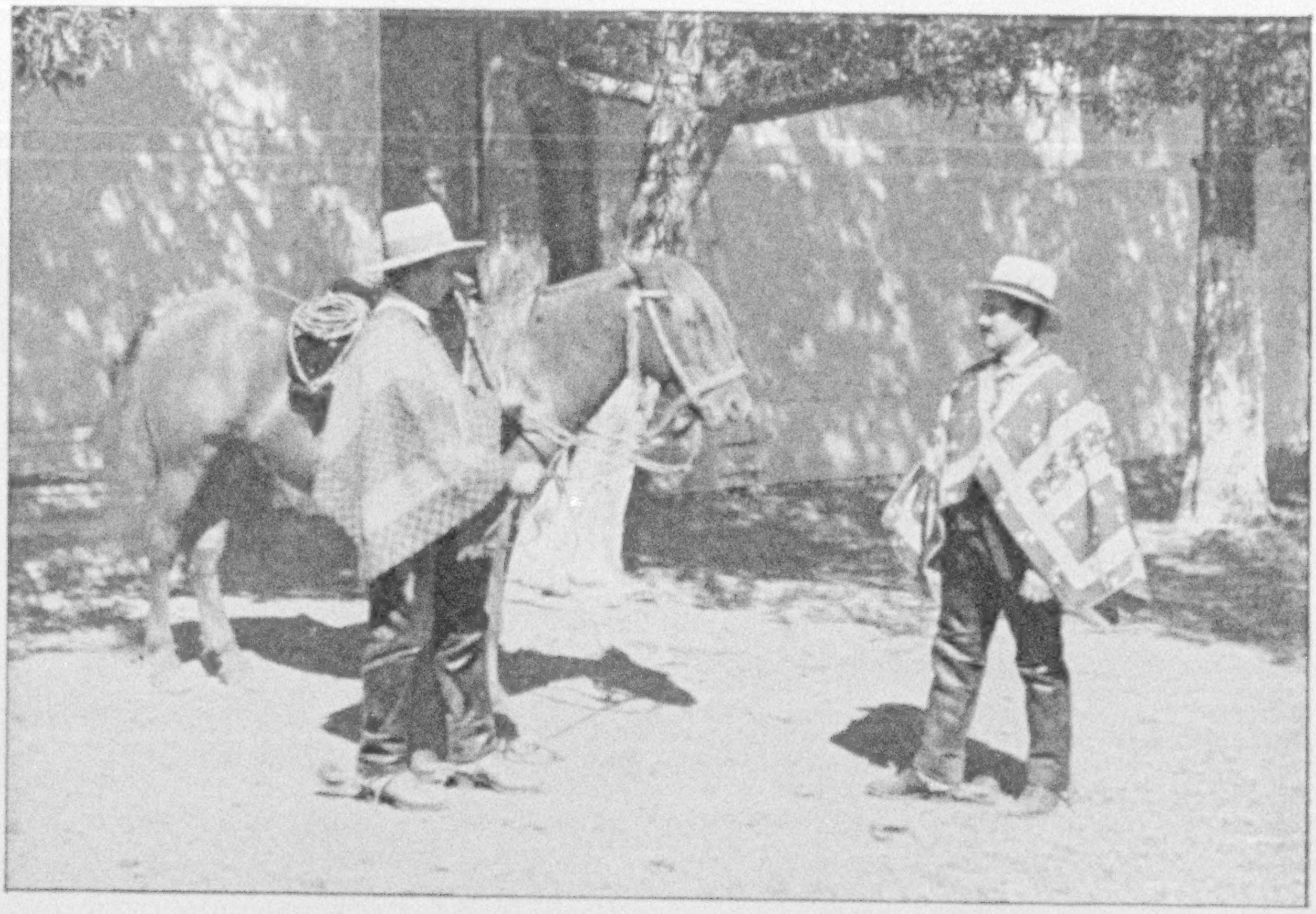
HIGH IN A WIND-SWEPT ANDEAN PASS, THE PRINCE OF PEACE PROCLAIMS A MESSAGE OF INTERNATIONAL GOOD WILL

A quarter of a century ago, the "Christ of the Andes" was placed in the Pass of Uspallata, more than 12,000 feet above the sea, on the border between Chile and Argentina. It was cast from bronze cannon of the two nations, and stands as an emblem of their adherence to the doctrine of "peace on earth, good will to men." The Transandine Railway burrows through the Continental Divide near here, one end of the tunnel being in Chile and the other in Argentina.



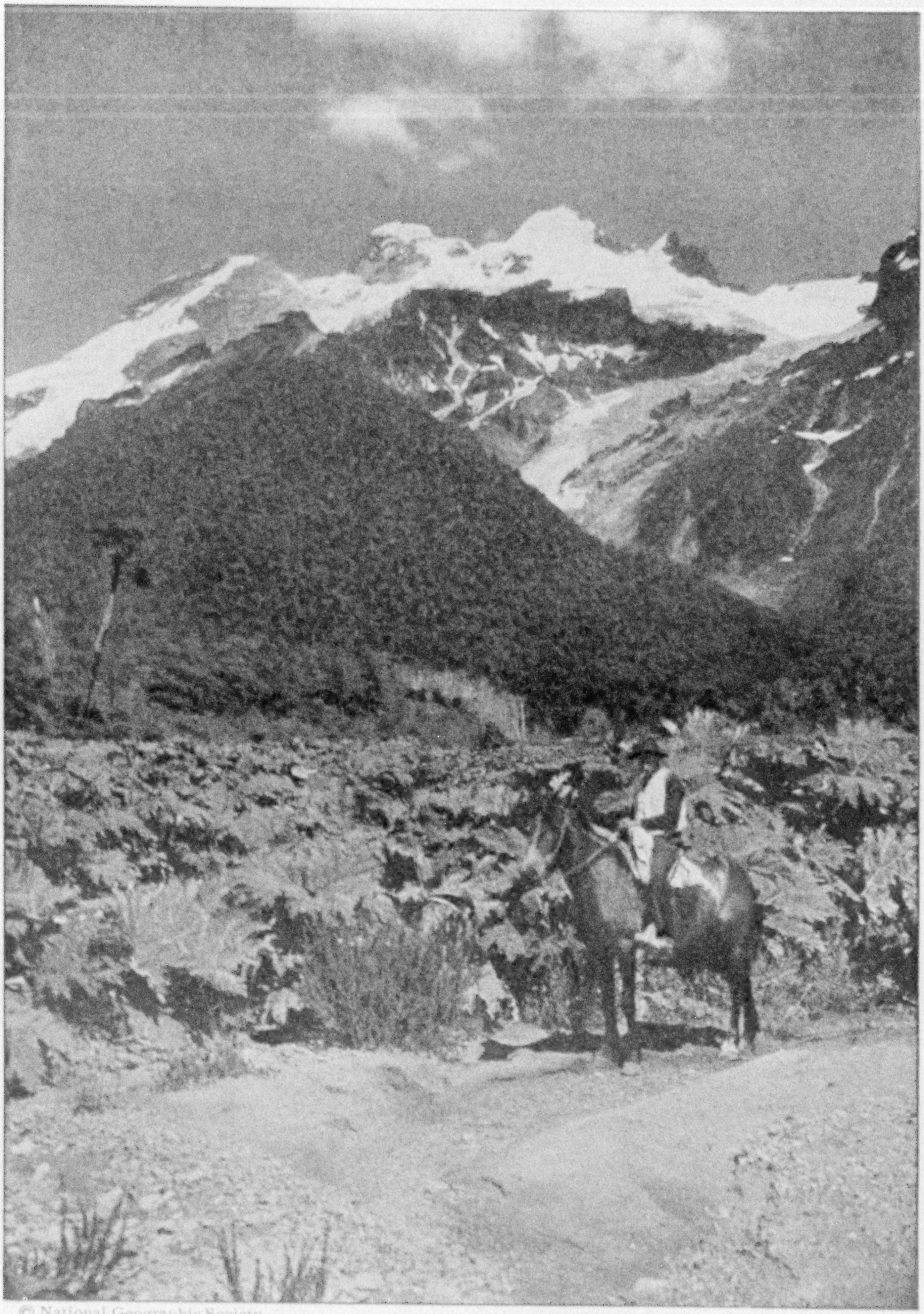
CHILEAN COWBOYS ARE TO THE SADDLE BORN

© National Geographic Society

Autochromes by Jacob Gayer

THE ARTS AND SCIENCES ARE WELL REPRESENTED AT SANTIAGO

Besides museums, the capital city, which is a community of more than half a million inhabitants, contains a university and technical schools, botanical gardens, agricultural experiment stations, and both astronomical and seismological observatories. This is a corner in the Museum of Fine Arts.



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ETERNAL SNOWS CROWN THE HEAD OF "EL TRONADOR"

This mountain comes by its name of "The Thunderer" from the avalanches which roll down its sides and send reverberations into all the surrounding valleys. The region hereabout suggests the Bernese Oberland and has been aptly termed the "Chilean Switzerland." The large-leaved plants in the foreground are wild rhubarb.

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THEY TOIL ON PLAIN AND VINEYARD IN THE FERTILE VALE OF CHILE

Large quantities of fruit of various kinds are grown here, but the soil and climate are especially adapted to viniculture and the wines of the country rank with those of France. Much of the land is in great estates, which maintain an almost feudal atmosphere and have large numbers of permanent retainers. The young man at the right is a *huaso*, or cowboy (see also Color Plate II). The expert horsemen of the central plain begin to ride almost as soon as they walk.

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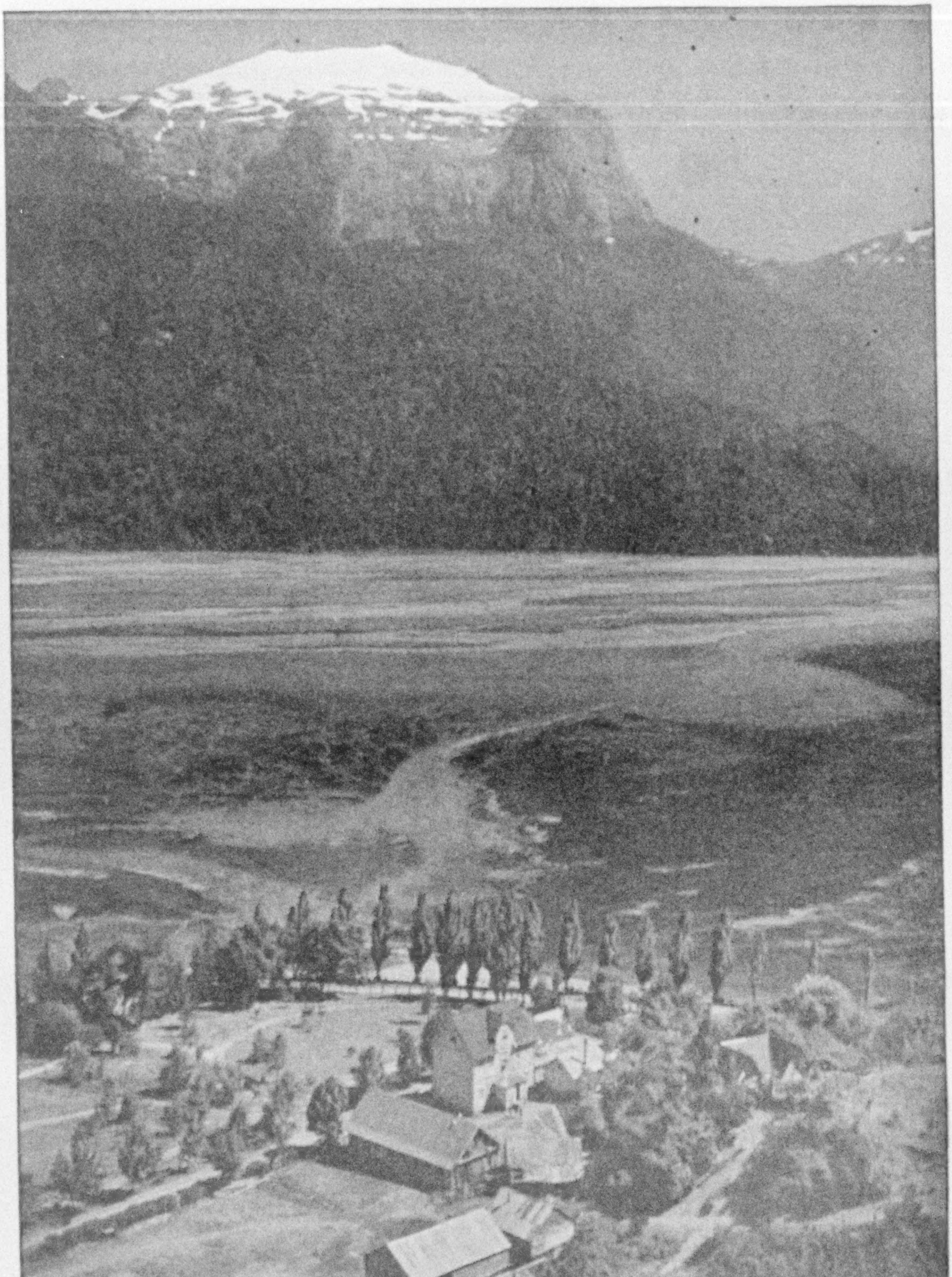
VIÑA DEL MAR IS A SUMMER MECCA FOR THE ÉLITE

The aristocracy of the Republic flock to this bougainvillæa-draped suburb of Valparaiso during the summer months of January, February and March. Although there are many fine automobiles in fashionable Viña del Mar, one of the most delightful ways to enjoy its beautiful parks and shore drives is in an open carriage behind a pair of Chilean horses, which, though rather small, are hardy and fast.



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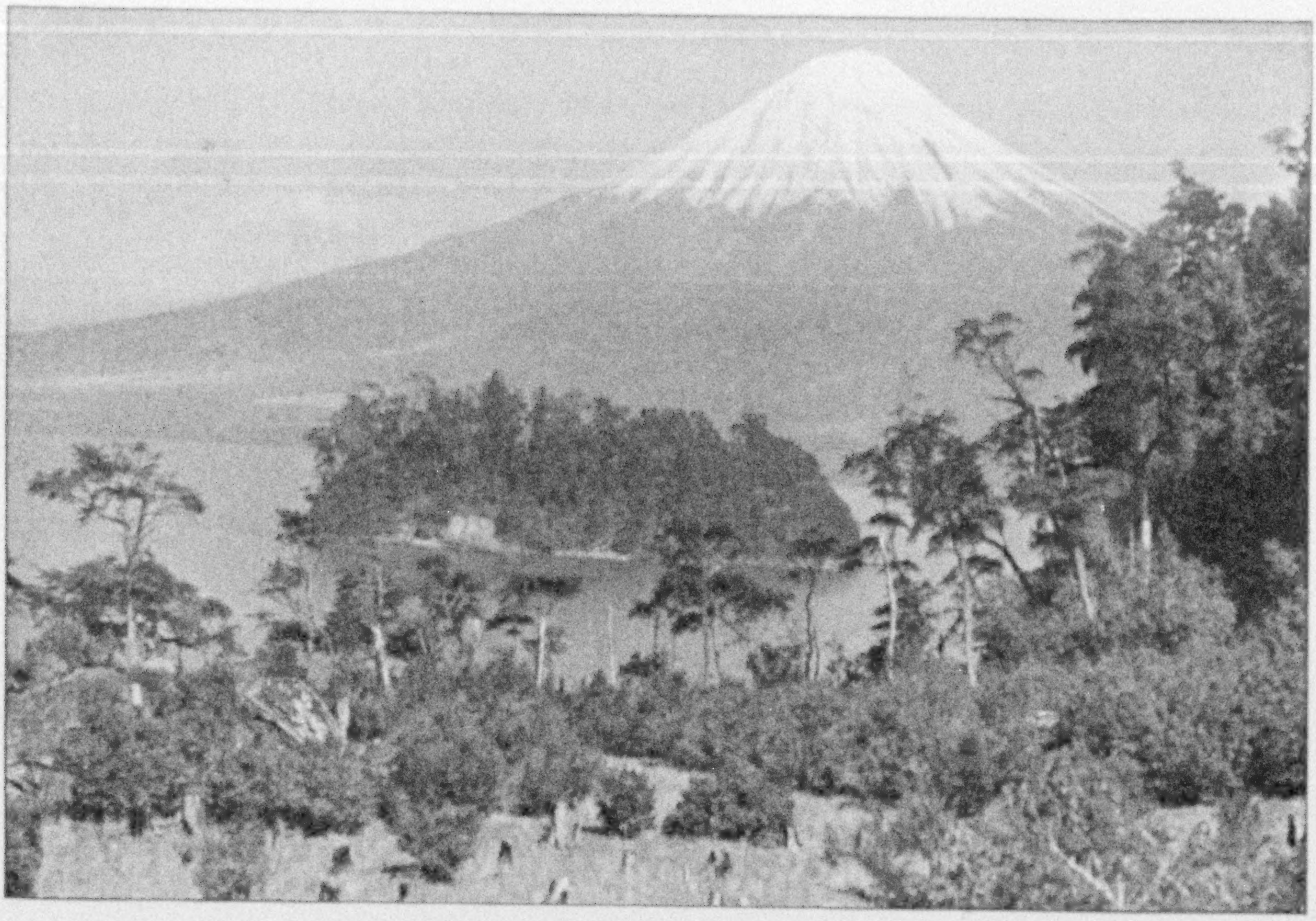
A WAY STATION ON THE SOUTHERN OVERLAND ROUTE TO ARGENTINA

Those who have time for leisurely travel and wish to avoid the rigors of the high altitude on the Transandine Railway journey from Santiago to Buenos Aires, frequently go by way of Peulla. This tiny village is a day's journey east and south of the railroad at Puerto Varas. From here the trip across the mountains into Argentina is made by motor and horseback. This route is particularly favored in summer because of its scenic attractions.



THE PERFECT CONE OF MOUNT OSORNO BEARS STRIKING RESEMBLANCE TO FUJIYAMA (SEE ALSO COLOR PLATE XVI)

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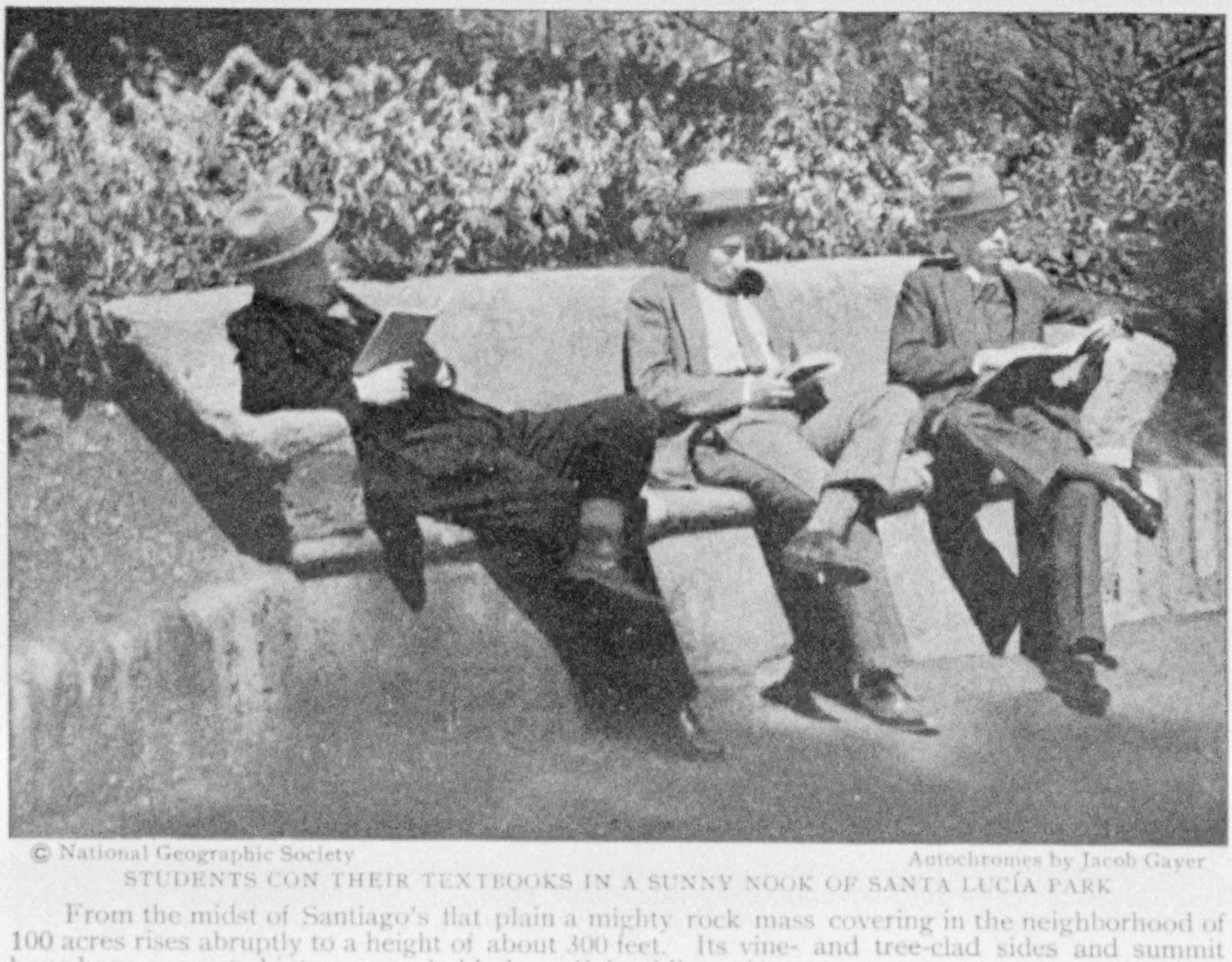
PUERTO MONTT LINKS THE MAINLAND WITH THE ISLE OF CHILOÉ

The largest of the Chilean islands lies about two-thirds of the way down the country's lengthy coastline. Its chief crops, potatoes and firewood, are carried to Puerto Montt, on the mainland, in boats of this type.

AGRICULTURE IS SECOND ONLY TO MINING IN IMPORTANCE

More than 5,000,000 acres are under cultivation in Chile. The principal crops are cereals, grapes and potatoes. These women are hoeing potatoes in the region of Peulla (see Color Plate VI).



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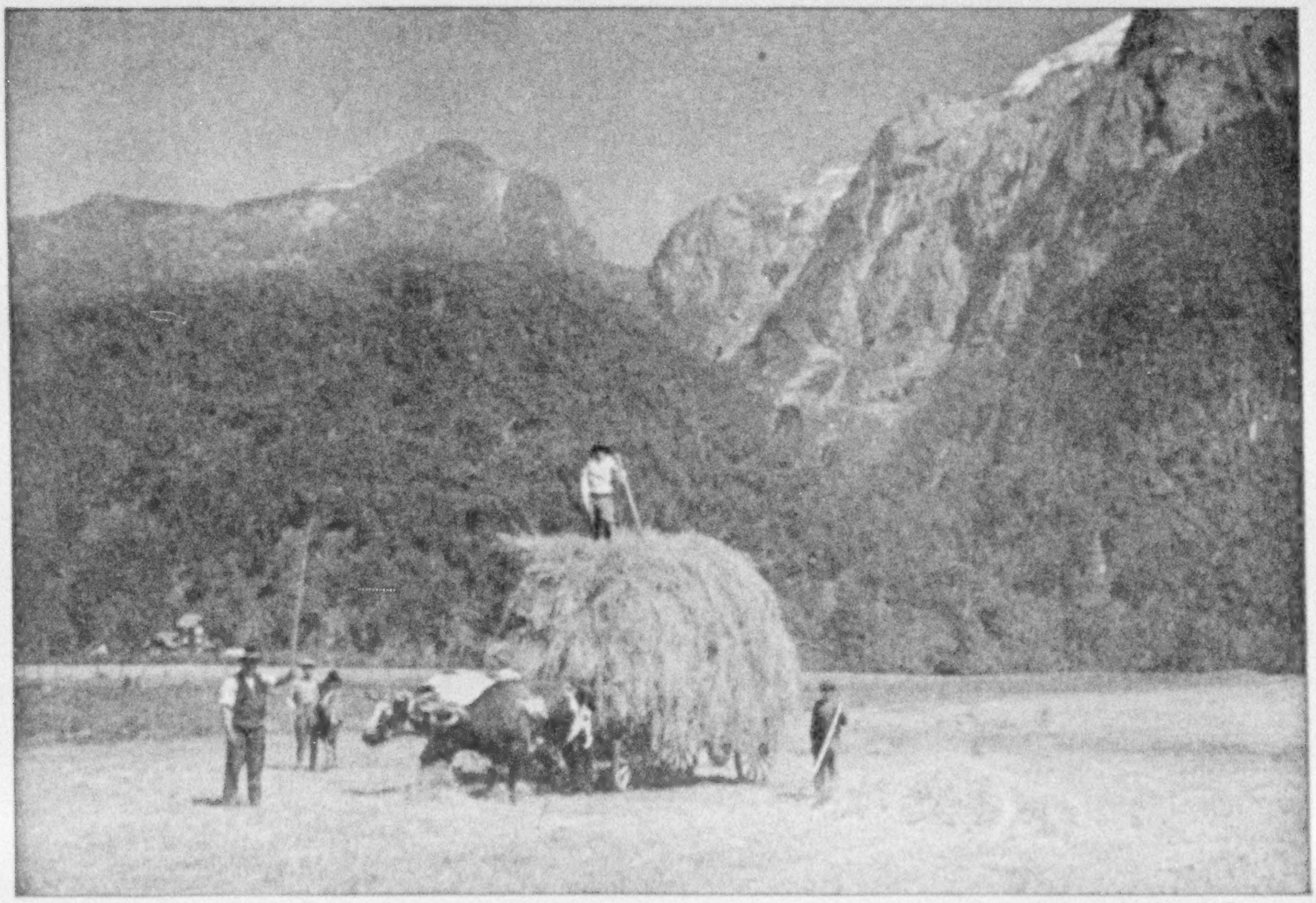
STUDENTS CON THEIR TEXTBOOKS IN A SUNNY NOOK OF SANTA LUCÍA PARK

From the midst of Santiago's flat plain a mighty rock mass covering in the neighborhood of 100 acres rises abruptly to a height of about 300 feet. Its vine- and tree-clad sides and summit have been converted into a remarkably beautiful public park.

IN A LAKE REGION WHICH HAS WON THE ACCLAIM OF WORLD TRAVELERS

This part of the Republic is one of the playgrounds of the nation and every summer its scenery attracts thousands of visitors. Peulla, on the shore of Lake Todos los Santos (All Saints).



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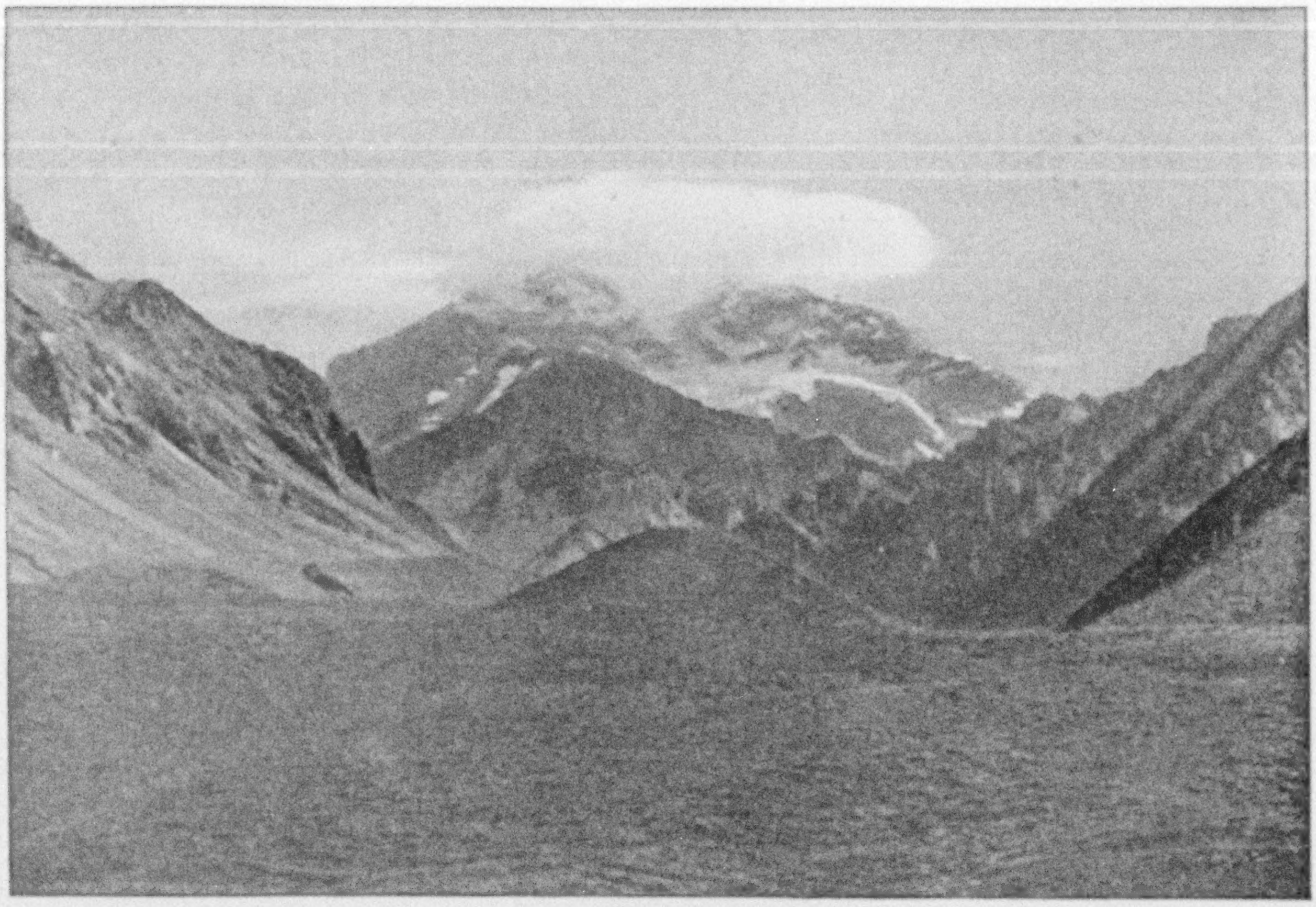
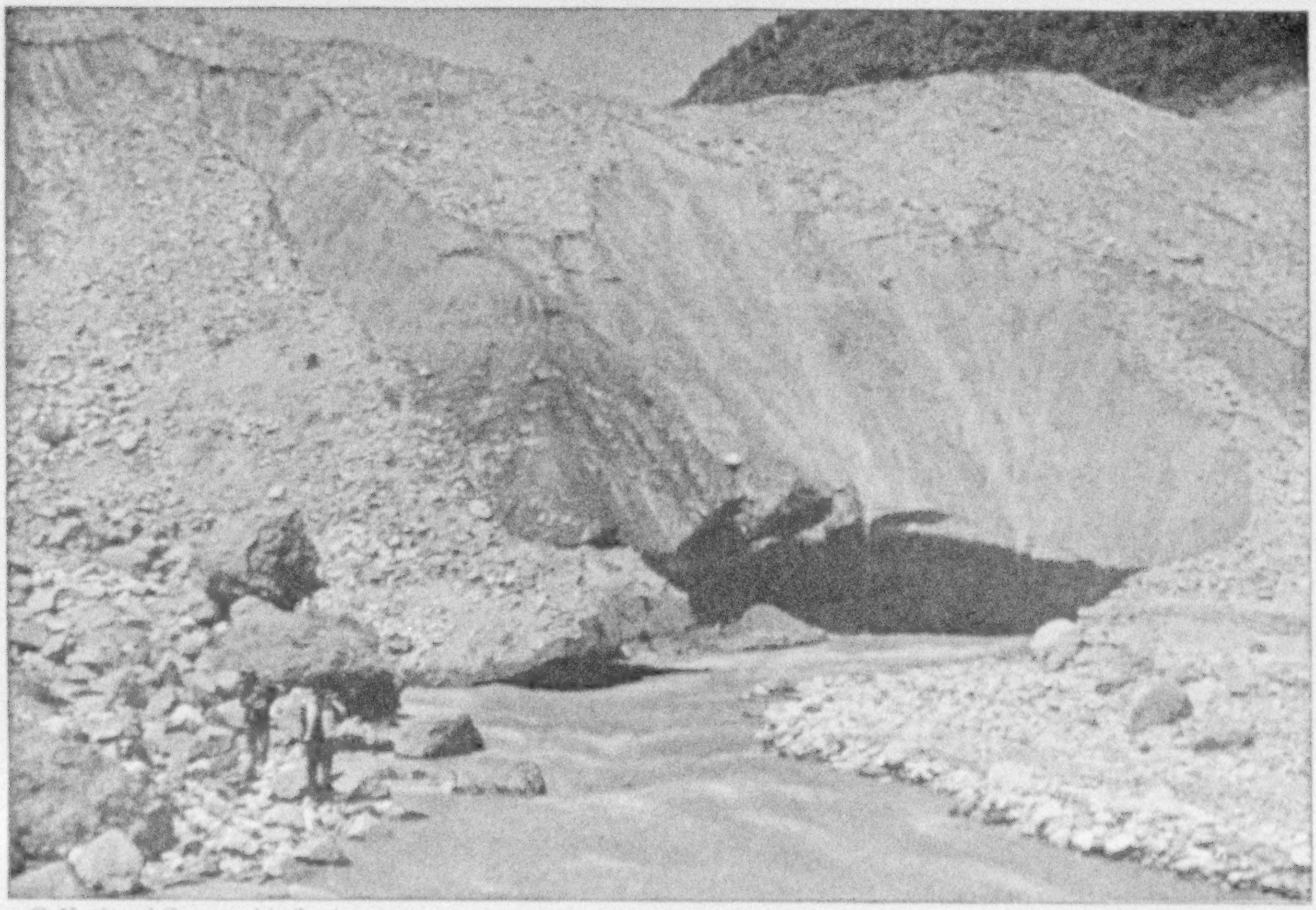
NORTH AMERICA'S WINTER IS HARVEST TIME UNDER THE SOUTHERN CROSS

Those who live in the Northern Hemisphere find it hard to realize that the seasons are reversed on the other side of the Equator. However, this seasonal difference provides Chilean fruits with a New York market.



CLOUDS OBSCURE THE HIGHEST POINT IN THE WESTERN WORLD

On the Andean border between Chile and Argentina, Aconcagua towers skyward more than 23,000 feet. The giant shrouds its head in a mantle of mist and rarely permits an unobstructed view.



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A RIVER IS BORN FROM THIS MOUNTAIN OF ICE

Rubble covers the glacier which creeps down the slope of El Tronador (see Color Plate III) and only on close acquaintance is it seen to be other than a huge mass of earth.

FLOWER MERCHANTS DISPLAY THEIR WARES ON THE ALAMEDA

An established institution of the capital city is the open air flower market where masses of multi-colored blossoms are offered for sale.

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EVEN THE POOR CAN AFFORD FLOWERS IN SANTIAGO

For a few pennies a fine bouquet may be purchased from the street flower vendors, and for the equivalent of an American dollar enough blossoms may be had to decorate a whole house.

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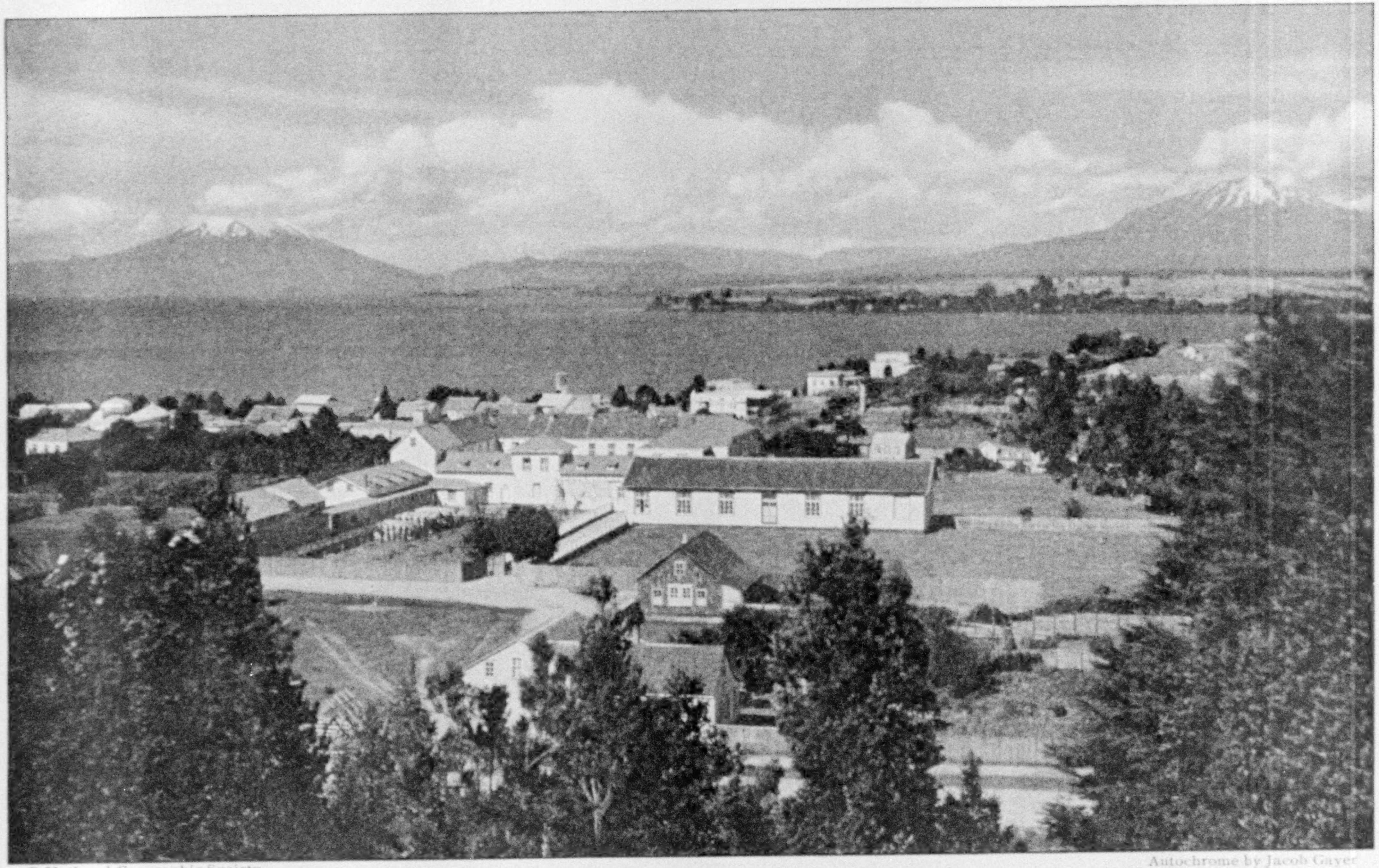
Autochrome by Jacob Gayer

PUNTIAGUDO'S JAGGED PEAK HAS NEVER SURRENDERED TO MAN

Although a little less than 7,500 feet high, this needle-pointed summit has defied all efforts to scale it. Dairy farming is carried on extensively around the shores of Lake Todos los Santos (see also Color Plate IX). An American owns an estate in the vicinity, spending half his time there and half in the United States, thus successfully dodging cold weather the year round.



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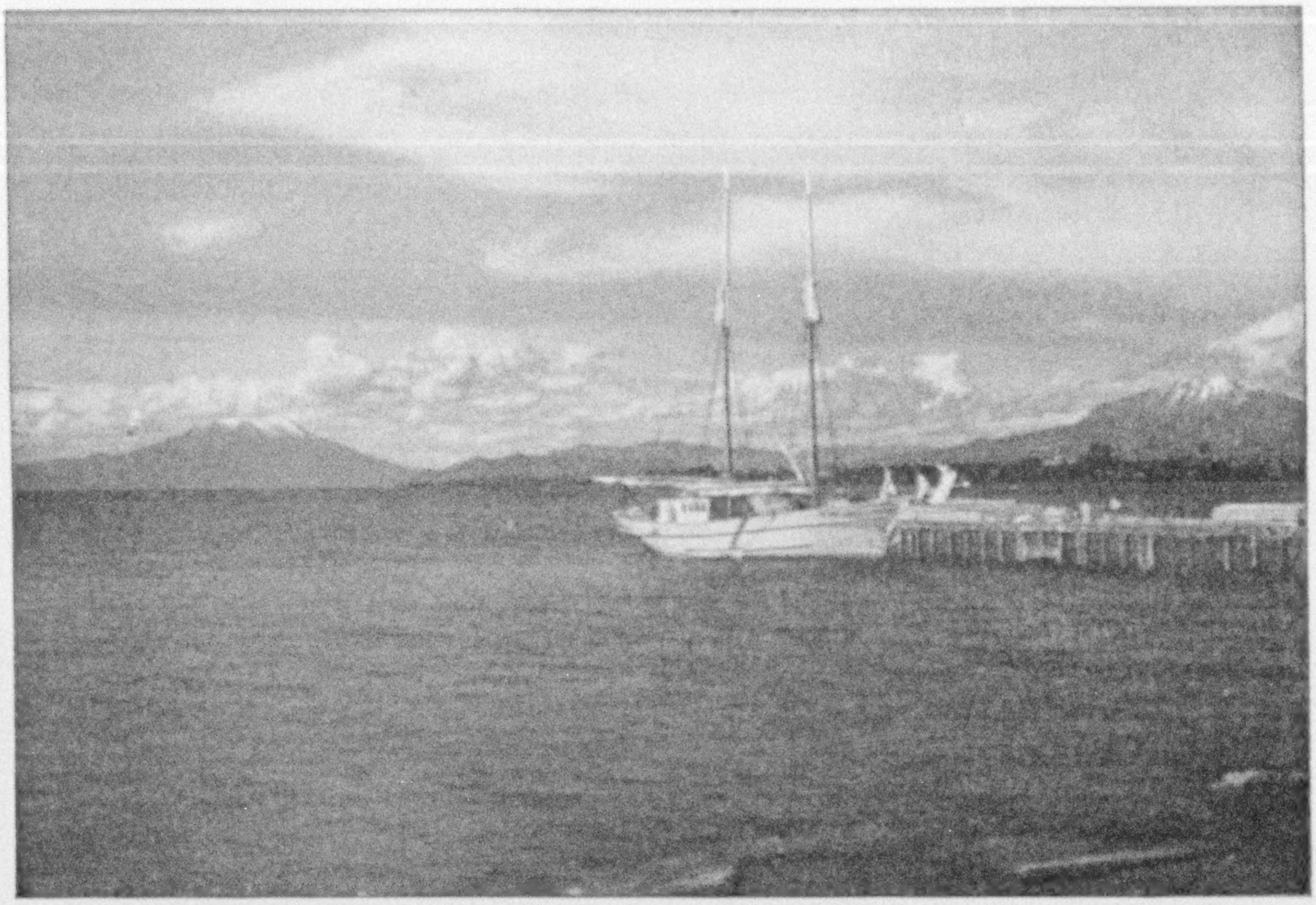
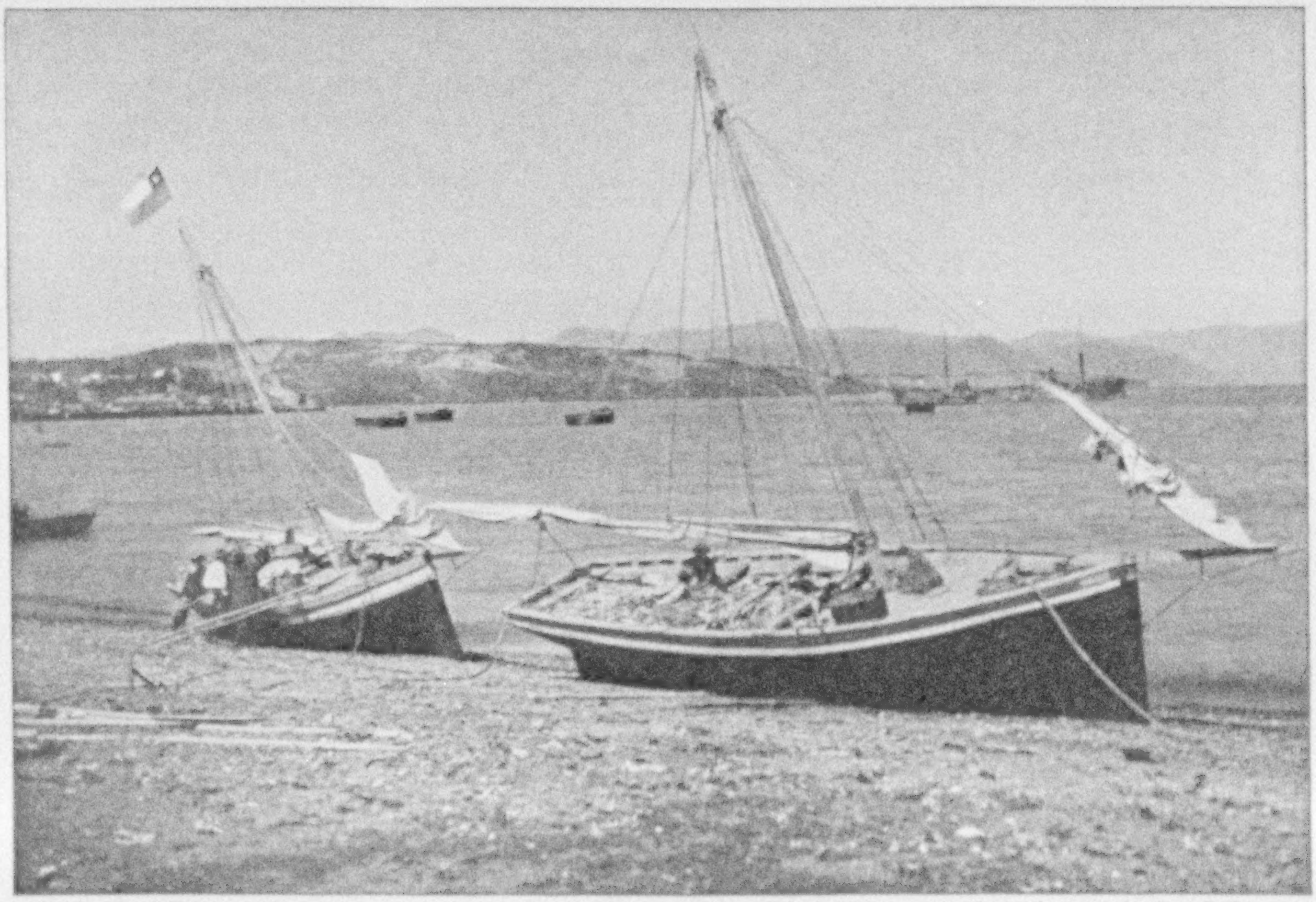
PUERTO VARAS, ON LAKE LLANQUIHUE, IS ESSENTIALLY A SUMMER SETTLEMENT

Although it serves as a kind of clearing house for the products of the surrounding agricultural region, this town is primarily devoted to the entertainment of summer visitors. There is a numerous and strongly solidified German element here which imparts to the community much of the atmosphere of an Old World village.



VOLCANOES GIRD THE ULTRAMARINE WATERS OF LLANQUIHUE

The largest fresh-water lake in Chile covers an area of about 285 square miles and its waters are unusually clear. The peak at the right is Calbuco, a volcano which has been active within recent years.



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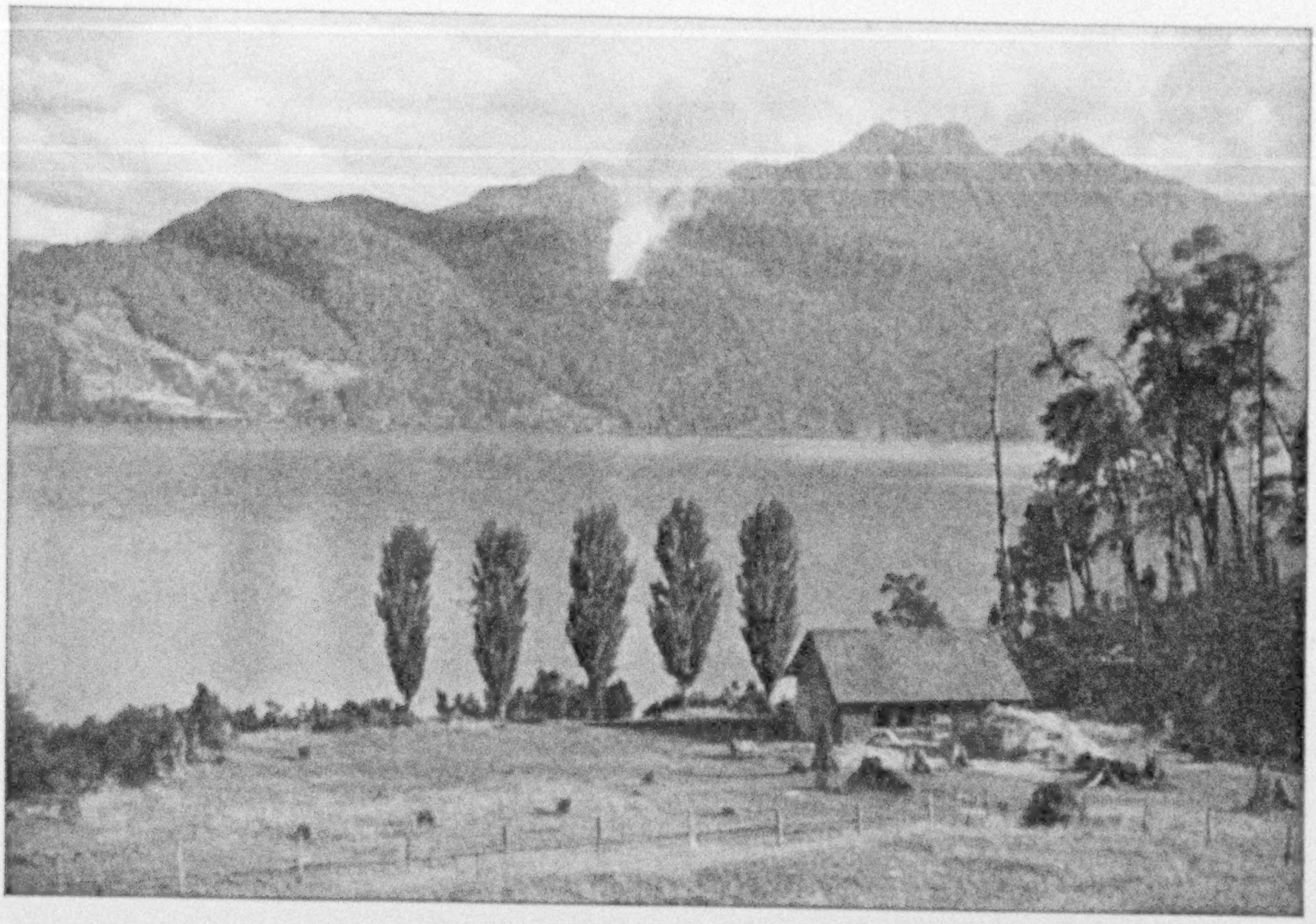
THE BEACH WHERE PUERTO MONTT'S CLAMBAKES ARE HELD

The *curanto*, a favorite festivity of Southern Chile, resembles in some respects a North American barbecue. The food is baked in a pit dug in the sand. Originally only clams and oysters were cooked in this way, but now ham, sausages, sweet corn and potatoes are included.



FARMS OF THE SOUTH WERE HEWN FROM FORESTS

Until comparatively recent times Southern Chile was a vast primeval forest. However, the ax of the pioneer has been so busy that the Government has been forced to pass protective legislation for the trees.

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MANY SONS OF SWITZERLAND HAVE FOUND NEW HOMES IN CHILE

The man to the left is a Swiss who has brought the dairy secrets of his fatherland to his home in the New World. Oxen are almost universally used as draft animals in mountain regions, where rough roads and steep grades put a premium on strength rather than speed.

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SNOW-DRAPED OSORNO BROODS IN ISOLATED MAJESTY

Its perfect shape, low snow line, and magnificent setting combine to make this mountain one of the noblest of the Andean range. The emerald waters of Lake Todos los Santos lave its base and provide, under favorable conditions, an excellent reflecting mirror for its symmetrical beauty (see also Color Plate VII).

over the sides of the animals, sticking out many feet both fore and aft. The Chileans have a way of making almost anything accommodate itself to packsaddle transportation.

Sharing the streets with the packsaddle donkeys are the strings of carts, drawn in the fashion of the country—one horse hitched between the shafts, and at its left a second, attached to the cart by means of a breast collar and a single rope trace. This second horse carries a saddle, and the free end of the breast strap is fastened thereto. Its main duty is to carry the man who drives the cart. The single trace enables it to help out the horse in the shafts on steep grades or in heavy mud.

THE SPRING AND SUMMER BEAUTIES OF VIÑA DEL MAR

The life which ebbs and flows downtown and on the heights of Valparaiso may be picturesque and distinctive, but the real thrills are reserved for those who go to its Viña del Mar in summer. Playing the dual rôle of an Atlantic City and a fashionable suburb, this community is one vast flower garden five miles long, climbing from the seashore to the heights. Villas bowered in roses, wistaria, poppies, pansies, blooming trees, and rich shrubs; chalets standing on terraces clad in all the gay colors of Chile's floral wealth; high-walled gardens, formal in treatment but warm and beautiful in aspect—all these join with blue sky, gray rocks, and ultramarine sea to make a setting for the gay summer life for which the great seaport has long been famous (see Color Plate V).

Viña del Mar at the height of the summer social season is the very incarnation of quiet, dignified smartness. The magnificently matched horses drawing the finest examples of the coach builder's art, the dogcarts, and other types of horse-drawn vehicles share the boulevards with the latest European and American custom-built motor cars.

When the inland weather becomes hot and dusty, all of the socially elect of Santiago and of the other cities and towns of central Chile come down and take villas or chalets here (see map, page 140).

Horse racing is a passion with the Chileans, and the summer racing season at the Viña del Mar Jockey Club brings to its tracks the best stables of the whole country. The grand stands on Sunday present a living Who's Who of Chile (p. 222).

Joviality is a sparkling characteristic of life in Viña del Mar. The Valparaisan will dance until the wee small hours have begun to grow large again, amid surroundings that include light-illuminated fountains which pour out their waters in all hues. He may sleep late, but next morning he will bathe in Fisherman's Bay, revel on the narrow sandy stretch, and then go to the pier to sip his wine and watch the passing show. The water, however, chilled by the proximity of the Humboldt Current, is rather too cold for the women, and most of them prefer to look on.

When one boards a train at Valparaiso for Santiago, the Capital City of the great ribbon republic that lies between the crest of the Andes and the sea, with its head resting well within the Tropics and its feet in the Antarctic Ocean,* the airline distance is only about 50 miles, but the railroad journey is more than 100 miles. The train is drawn by an electric locomotive built in the United States, while its passenger cars, of North American design, are of European construction.

Train travel in Chile in midwinter is not a pleasant experience, for there are no heating facilities in the cars; but if one has his steamer rugs along, the panorama from the window is a delight to the eye. On one of my trips from port to capital I took a slow, mixed train in order to observe the rural life of the country.

CLAPPING "ALL ABOARD"

When everybody was aboard there was no sonorous call of the Spanish equivalent of "All aboard," but a clapping of hands, which started at the engine and swept back along the platform to the rear coach. It made one feel that the crowd on the platform was applauding the departure of the travelers. However, with the last clap a bell rang and the train began to move.

Leaving Valparaiso, the line runs northward through the low coastal mountains and into what resembles in many respects one of the sequestered valleys of middle California. Here and there are fine haciendas, where one may discover what for-

* See, also, "A Longitudinal Journey Through Chile," by Harriet Chalmers Adams, in the NATIONAL GEOGRAPHIC MAGAZINE for September, 1922.

Photograph by Jacob Gayer

VICTORIA PLAZA IS VALPARAISO'S LARGEST PARK

The church in the background is the Espiritu Santo, the city's most fashionable place of worship.

estation can do for a country. Millions of eucalyptus trees have been planted, and a region once almost bare of tree life now has a goodly supply of fair-sized timber. The trees are planted in rows and flourish splendidly in the rich volcanic-ash soil of the inland valleys.

Soon one comes upon a large German settlement with scattered houses and many windmills; later upon a quaint old town that seemingly has not changed its aspect materially in centuries. Then the train swings into the valley of the Aconcagua River, on whose flood plains are some of the finest vineyards in the world. The river itself holds a wide area under its special sovereignty. Swift and clear, it rushes down from the majestic heights of the apex of the New World, choosing now one channel and now another, thus monopolizing a territory which in many places is several miles wide.

Range horses wander about, feeding where they can in the season of low water and occasional pastures. Here a branch of the channel sweeps back to the edge of the right of way, and all kinds of baffle works are employed to keep it from undermining the railroad itself.

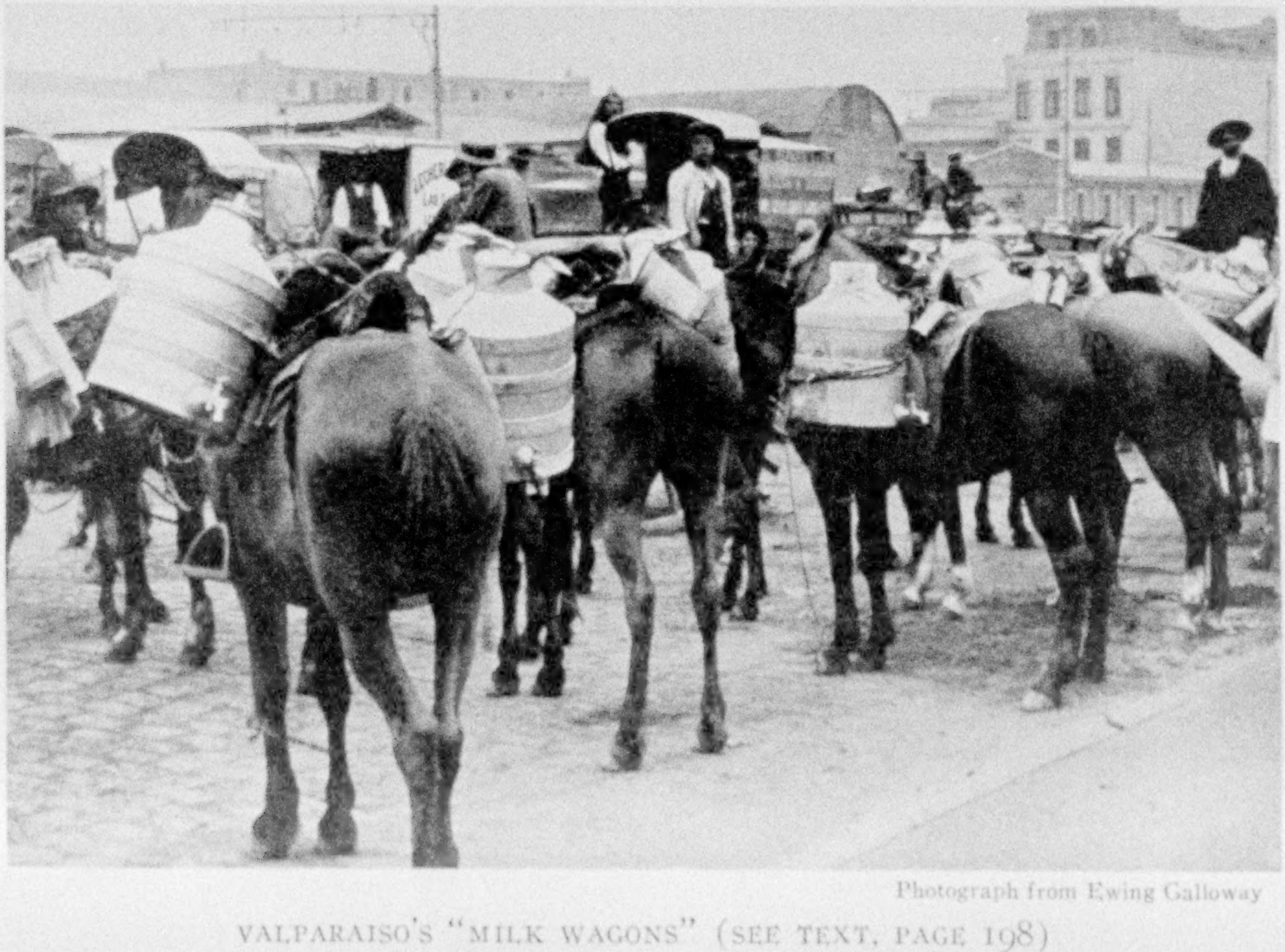
A RARE VIEW OF ACONCAGUA

About midway of the journey and facing the magnificent canyon through which the Aconcagua River debouches from the

Photograph by Jacob Gayer

THE BATHING BEACH AT VALPARAISO

The waters on the Viña del Mar sea front are always too cold for any but hardy bathers.



Photograph from Ewing Galloway

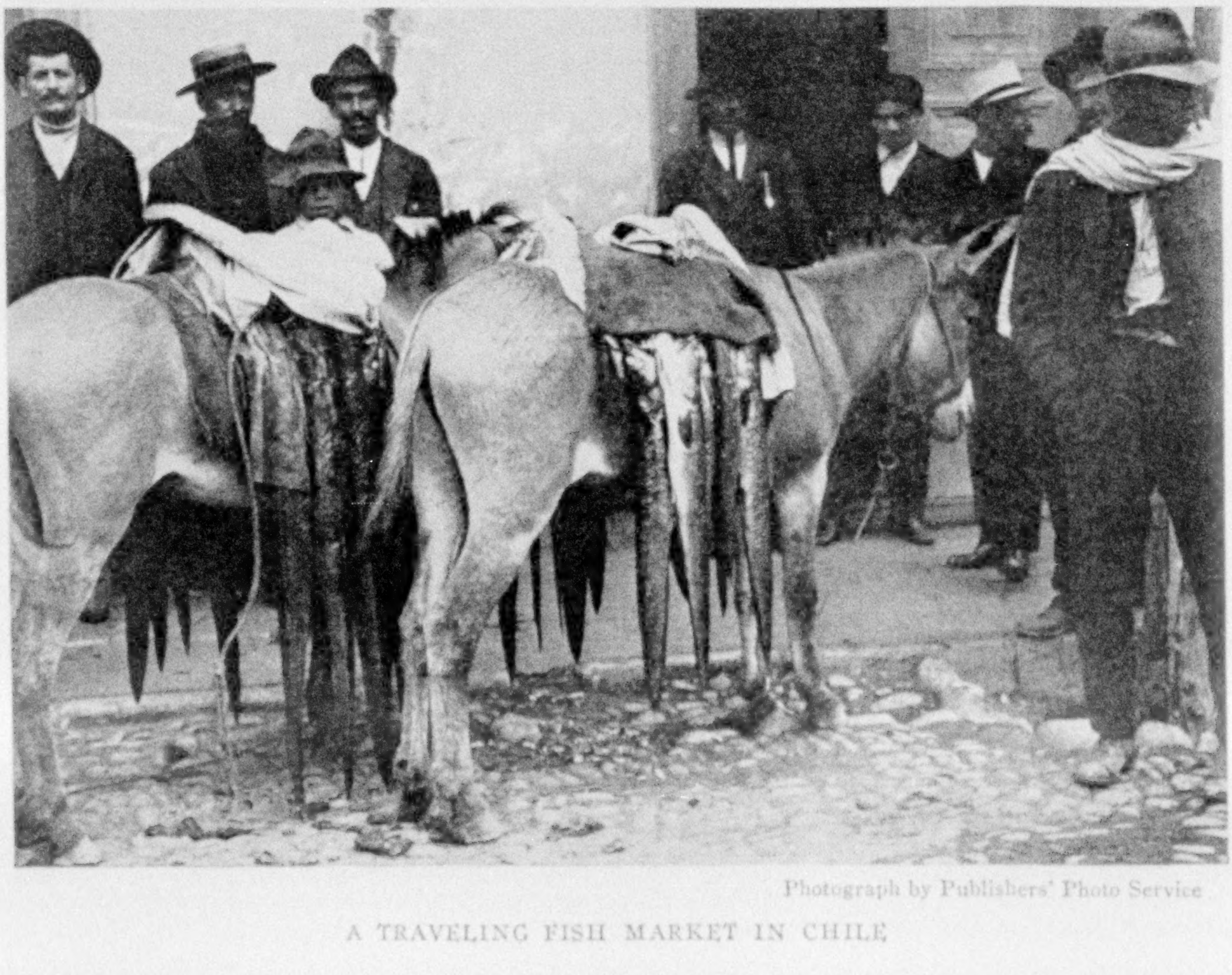
VALPARAISO'S "MILK WAGONS" (SEE TEXT, PAGE 198)

South America's greatest need to-day is good roads. Pack horses, high-wheeled carts, and ox wagons provide the principal means of transportation on Chile's highways. The Government, however, has recently launched a good-roads program.

Photograph courtesy Chile Magazine

THE GOVERNOR'S PALACE AT VALPARAISO

The Republic of Chile is divided into sixteen provinces and two territories.



Photograph by Publishers' Photo Service

A TRAVELING FISH MARKET IN CHILE

© Publishers' Photo Service

THE PRAT MONUMENT IS THE PRIDE OF VALPARAISO

Situated in the Plaza Sotomayor, the Loop District of Valparaiso, the Prat Monument, overlooking the harbor on the one hand and the Governor's Palace (see opposite page) on the other, was erected "to the Heroes of the 21st of May." It commemorates the naval battle between Peruvian and Chilean ships off Iquique, May 21, 1879. The Peruvian *Huáscar* rammed the Chilean *Esmeralda*. At this juncture Captain Prat, of the *Esmeralda*, leaped aboard the *Huáscar* and expected his men to follow for a hand-to-hand conflict. But only one followed before the vessels separated, and both were shot down. The *Esmeralda* was thrice rammed thereafter and sunk, only 50 of its crew of 200 being rescued.

mountains lies Llay-Llay, the junction point where one branch of the line goes to Los Andes, to connect with the Trans-andine Railway, and the other to Santiago. Llay-Llay means "Great Wind." In the old Indian dialect a repeated word meant "great" or "many," and one encounters this terminology in many places in Chile.

It was a particularly clear day when I came to Llay-Llay, and, looking up the valley through the V-shaped canyon, I saw Mount Aconcagua towering more than 23,000 feet into the skies. Although the summit was some 70 miles away, it seemed so close at hand that one felt like forsaking the train and starting out afoot for its conquest. Between its several peaks, which resemble the knuckles of a closed hand, one's eye could follow the glaciers coming down the spaces between the fingers. It is rare that the people of Chile get this view of Aconcagua, for usually its head is hidden beneath the clouds of the inner regions of the high Andes (Color Plate X).

Leaving Llay-Llay, the road to Santiago climbs out of the valley of the Aconcagua River. Here it follows an extensive system of irrigation ditches, and over to the right stretches one of those big haciendas where life is lived amid the strange contrasts of the 18th and 20th centuries. Modern tractor-drawn gang plows, less modern horse- and ox-drawn iron plows, and even the old wooden plows of the type that did duty before the Christian Era, are to be seen in the vast fields whose soil is being prepared for the next crop.

The high-booted, broad-hatted, poncho-covered figure of the *hacendado* riding here and there over his hacienda, administering his affairs as the lord of a little principality, is frequently seen.

Strings of pack horses laden with casks of wine slung across the packsaddle pass

Photograph by Jacob Gayer

HOW VALPARAISANS "GO UP TOWN"

On the bluff in the background is one of the city's numerous ascensors. One of the cages always ascends as the other comes down. Fares are collected at the lower end (see, also, text, page 198).

along what answers for a highway, but which is little more than a commons; high-wheeled carts and wagons drawn by from 6 to 20 oxen, laden with the products of the hacienda or with the brushwood from which the poor in Chile must get their fuel, make their labored way through mires of mud; herds of goats clamber about over the steep rocks where the hacienda ends and the mountain begins.

SANTIAGO A QUEEN IN A CASTLE

It is through such scenes as these that one begins to climb the watershed between the valley of the Aconcagua and those of the Mapocho and Maipo. When at last the train comes down out of the hills into the Santiago plains, the latter are seen to be as level as a floor, but studded here and there with splendid conelike minor mountains. Presently Santiago is reached, a city whose situation is second only to that of Rio in its beauty and its contrasts.

"Like a queen in the giant castle that Nature has given her," says one who has caught the city's spirit, "with walls of the imperishable granite of the Cordilleras reaching to the skies, she seems created for the homage of those who gaze upon her."

One sees the metropolis and capital of Chile to greatest advantage by climbing to the summit of Santa Lucía Hill, which rises out of the heart of the city much as the Acropolis is encompassed by Athens.

Let us climb up to the pavilion, built perilously on top of the rocks.

At our feet lies a community of a half million souls, dwelling for the most part in one- and two-story houses. But for the moment we have no eyes for the beauties of this fair city. To the east rise the mightiest ramparts of the Andes. As the clouds drift over the sun, lights and shadows pursue one another and one sees the majestic mountains in many marvelous moods.

Morning, noon, and evening they present different aspects; but perhaps one's favorite memory of them is when the shades of evening are gathering. A blue haze veils the metropolis as the sun sinks behind the horizon, and multihued shadows climb

higher and higher up the sides of the mountains until finally only the white crests of the loftiest summits are left in light.

At length they, too, must surrender the glory of the sun's light, and one's eyes turn back to the scene below—a vast city wrapped in darkness, but glittering with its tens of thousands of night jewels, made to shine by the hydroelectric engineer, who transmutes the melting Andean snows into light.

SANTIAGO FROM THE HEIGHTS

One turns in another direction and sees on the outskirts of the city San Cristóbal, a conical mountain springing up from the level plain and towering above Santa Lucía, as the latter rises higher than the city at its feet. The distant ridges that separate the valleys of the Mapocho and Maipo from that of the Aconcagua, and from the coast, add their beauties to this mountain-walled Eden.

Photograph by Jacob Gayer

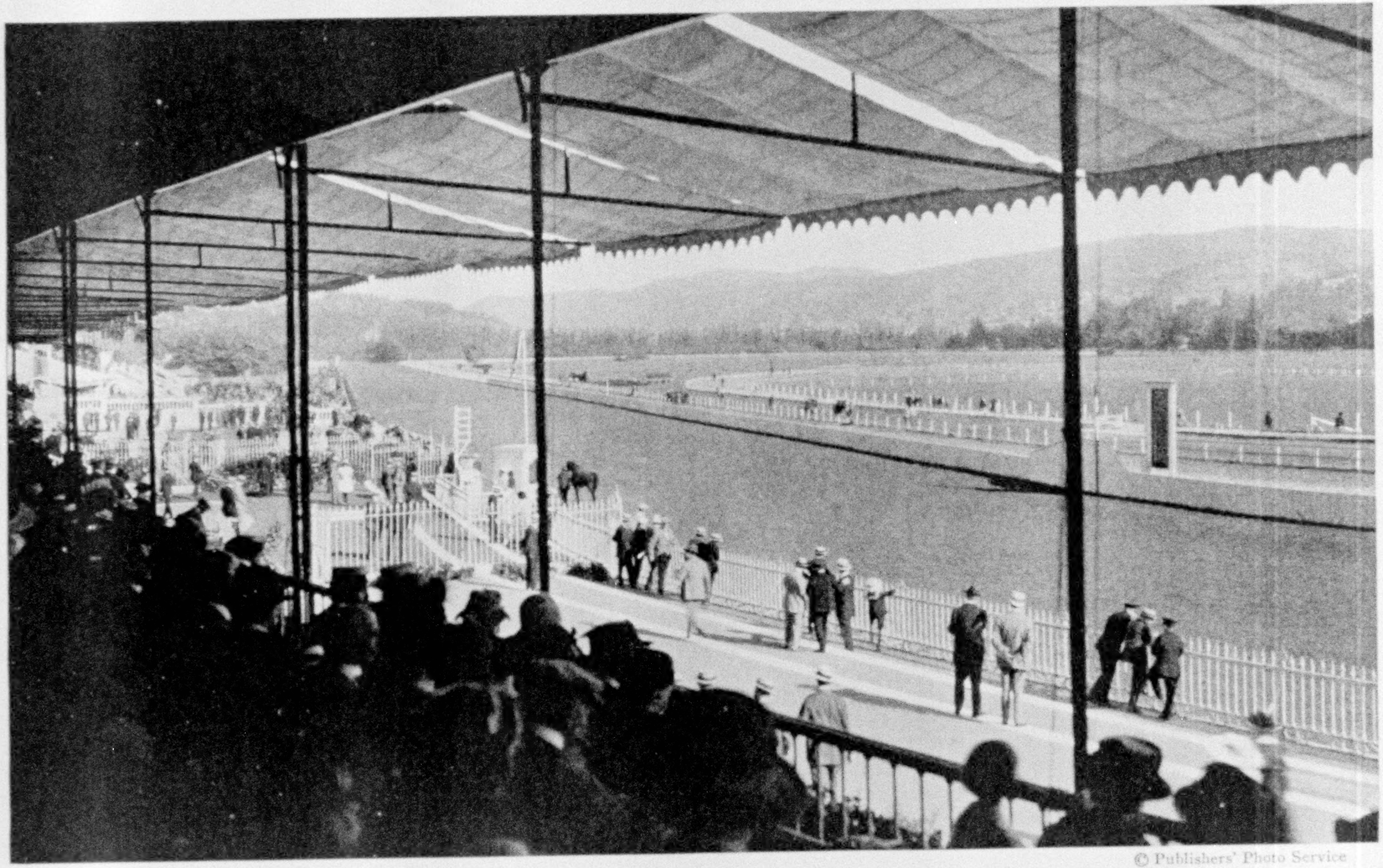
WOMEN RUN THE STREET CARS OF VALPARAISO

Many of the city's motor busses are also "manned" by women conductors, who have proved remarkably efficient in dealing with their "fares." The passenger, paying for his ride, gets a receipt. Somewhere along the line an inspector gets aboard, and if one has not his receipt to show, another fare must be paid.

Santiago itself is a city of innumerable domes and spires, which join with the few skyscrapers of the downtown district, the imposing railroad stations, and the great arched arcades to give diversity to its skyline. On the city's outskirts are the new hippodrome, perhaps the world's most beautiful racing plant; the Cemetery General (see, also, text, page 237); and the famous Parque Cousiño and the Quinta Normal.

Past and present mingle strikingly in the capital. Here rises the tower of the Franciscan Monastery from which sounded the bells of the curfew in days colonial, and there the steel-framed buildings of the commercial district. The cloister-constructed houses, with their open patios, red-tiled roofs, and stuccoed walls, are overshadowed by the brick and marble palaces which share the blocks with them and which radiate the architectural spirit of France and America. Even the old cathedral has had its ruddy stone concealed with stucco, and two fancy towers of Italian design have been added to its imposing mass.

Stretching past the base of Santa Lucia



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THE RACE TRACK AT VIÑA DEL MAR

Chile's winter racing meet is held at Santiago and its summer meet at Viña del Mar. While the course at the latter place does not compare in magnificence with the plant at Santiago, it still is on a par with many of the best tracks of the United States (see, also, text, pages 215 and 243).

© Publishers' Photo Service

THE ENTRANCE TO SANTA LUCÍA HILL, SANTIAGO

Situated in the heart of Santiago, Santa Lucía, once a rugged mass of upheaved rock, has been terraced and landscaped in a way that makes it a retreat of which any national capital might be proud (see text, page 225, and Color Plate VIII).

Photograph by Ewing Galloway

THE PLAZA DE ARMAS IN SANTIAGO, WITH THE CATHEDRAL IN THE BACKGROUND

It is to this plaza that the capital's socially elect come in the early evening for their promenade—an established custom in many of the major cities of Central and South America (see text, page 227).

Photograph by Pacific and Atlantic

MRS. HERBERT HOOVER, ON A GOOD-WILL TOUR, WELCOMED IN CHILE'S CAPITAL

The wife of the President-elect of the United States stepping from an automobile at the American Embassy in Santiago.

is that magnificent avenue officially known as the Avenida de las Delicias, but popularly called the Alameda. It is, as its name proclaims, truly the "Avenue of the Delights." Once the Mapocho River ran down a part of its length, but the city planners gave to this stream an artificial channel, and thus converted a river bed into a beautiful thoroughfare.

Some one visiting Santiago during the season when the rivers are largely dry, and seeing the numerous bridges spanning the canalized section of the Mapocho, remarked that Santiago ought to sell its bridges and buy a river; but in the flood season the necessity for the bridges is obvious. The Mapocho's waters flow through the city with the rush of a mountain stream, and only a Marathon runner could keep pace with a bit of board thrown into the water and carried downstream by the current.

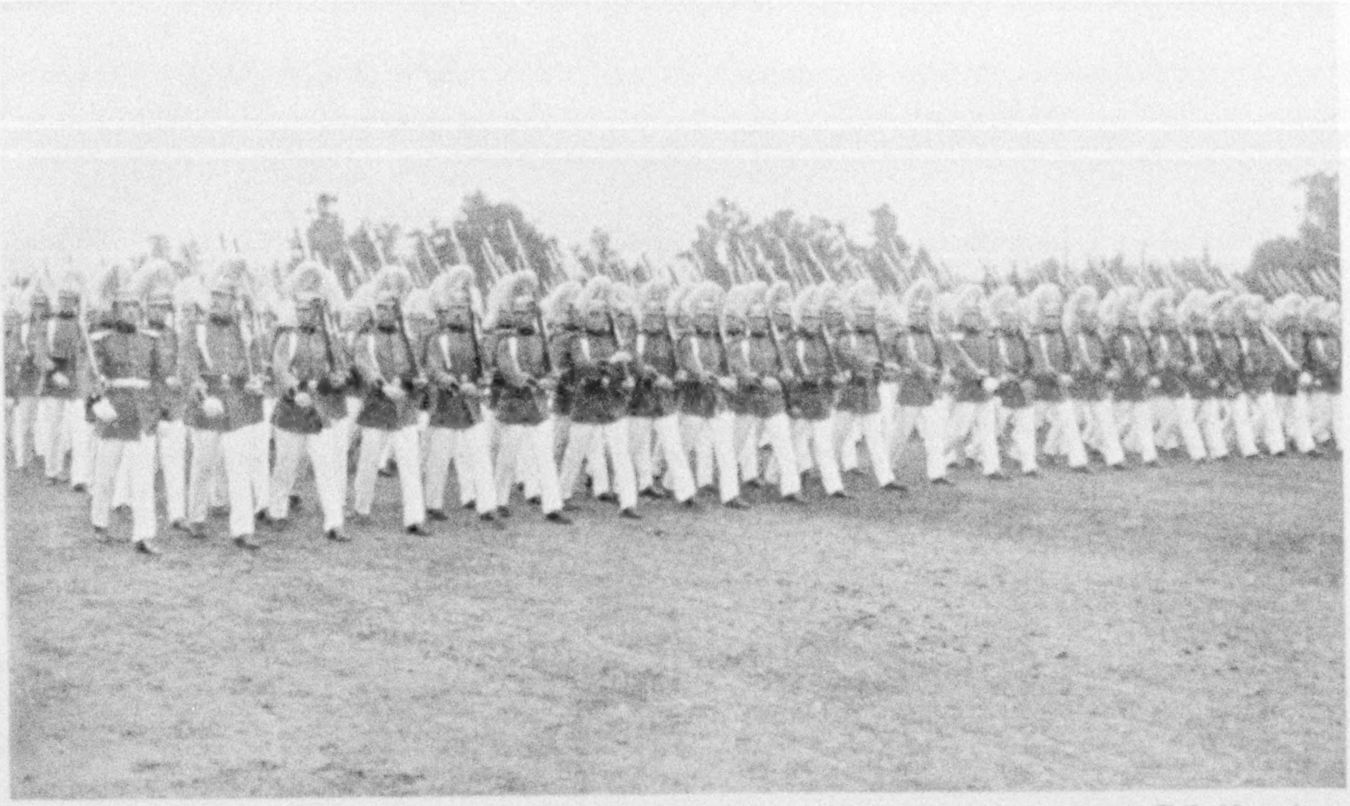
SANTA LUCÍA AN ENCHANTING HANGING PARK

On a charming terrace stands the statue of Pedro de Valdivia, surrounded by flower beds in which the most beautiful blossoms of Chile exude their fragrance to the memory of the hero it commemorates. The inscription tells us that "The valiant Captain of Estremadura, first Governor of Chile, in this very spot encamped his band of 150 conquerors, December 13, 1540."

It was from the top of Santa Lucía, with its sharp cliffs and steep slopes, that Huelen-Huala, surrounded by a gorgeous retinue of chiefs in full regalia, had been accustomed to issue his decrees to his people before the coming of the Spaniards. Now vanquished, he was forced to abandon his rock-bound citadel and dwell ever after in the valley below.

It was not until 1872 that work was begun on transforming this once rugged mass of rock into a magnificent hanging park, for which level Buenos Aires might freely offer a million cattle or a season's garnering of wheat. It was then that Don Benjamín Vicuña Mackenna began its transformation.

Public and private munificence alike have shared in its embellishment, and to-day it is a mass of luxuriant vines, blossoming trees, and flowers, with here and there glimpses of stairs, roadways, cliffs and



Photograph courtesy Chile Magazine

THE WEST POINTERS OF CHILE

Such names as O'Higgins, Prat, Purcell, Van Buren, and Vicuña Mackenna, all resplendent in Chile's history, tell of a melting pot in which the world's best fighting stock has been fused. Add to this a dash of Araucanian Indian blood in the command and a major part of it in the rank and file, and the secret of Chile's military fame in South America is revealed.

walls, towers and battlements, chapels and monuments. Flower beds and fountains ornament the terraces; trees, shrubs, and overhanging vines border the driveways and promenades. Here are dancing pavilions, restaurants with picturesque nooks and balconies, and rustic seats for those who wish to enjoy a view of the city, valley, and mountains from such a charming vantage ground (see Color Plate VIII).

WHERE "EXILES FROM HEAVEN AND EARTH" WERE BURIED

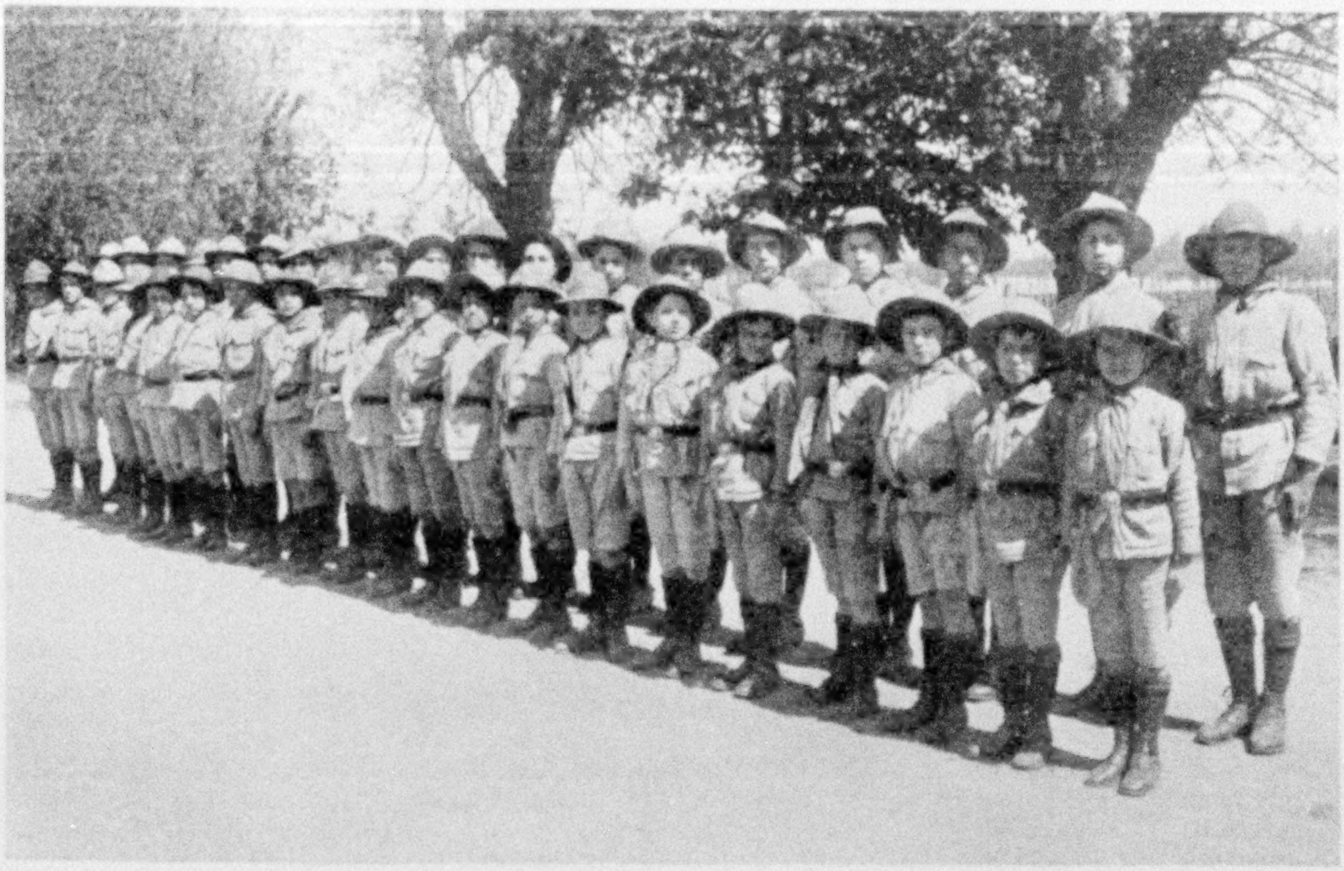
In former times the burial of Protestants and Jews in Santiago was a serious problem, as their bodies were not permitted to be interred in consecrated ground. So they were buried on the slopes of Santa Lucía. In the landscaping of the hill Vicuña Mackenna ordered their ashes removed to the public cemetery and directed that a marble slab mark the place of their former entombment. The inscription thereon, translated into English, says: "To the memory of the expatriated from heaven and earth, who in this place have lain buried during half a century, 1820-1872."

The main gateway of Santa Lucía, with its excellent statuary, its broad stairways, and its tiled parapet, forms a fit entrance to this beauty spot of Santiago. Here stands a fine bronze statue of Vicuña Mackenna with the figure of Fame seated at his feet, holding in her hand a wreath of laurel (see, also, page 223).

From Santa Lucía we wander up the Avenue of the Delights and appreciate the enthusiasm of the Santiaguino for his capital's major thoroughfare. For here one may see not only an imposing array of beautiful statuary, splendid residences, and all that makes a morning stroll delightful, but one may also find a cross-section of Chilean life.

A GREAT OPEN-AIR HALL OF FAME

The Alameda is 300 feet wide and four miles long. It was General O'Higgins who banished the river to make the city's principal boulevard (see text, page 225). Many new buildings border it, including the splendid National Library and the famous Club Unión. The central parkway formerly was adorned with four rows of trees—oaks, elms, acacias, and other varie-



Photograph courtesy Chile Magazine

BOY SCOUTS OF SANTIAGO

The Scout movement finds enthusiastic support in the major cities of Chile. These scouts seem as much at home in helping to handle crowds during big celebrations as are North American youths belonging to the same organization.

ties. In recent years these have been removed as a military precaution.

The Alameda is Chile's "Hall of Fame," not encompassed by four walls, but placed in the capital's most frequented promenade, where the birds sing and the children frolic, and where the stories of sculptured marble and bronze inspire the multitude to patriotism and courage. Here is a stately monument in memory of Don José de San Martín, the Washington of South American freedom. He is represented on horseback crossing the Andes and carrying in his right hand a standard of Liberty. Another equestrian statue recalls the country's debt to General Bernardo O'Higgins. Cast in bronze, it represents him leaving Rancagua with his brave soldiers and exclaiming, as he points in the direction of Santiago, "We neither give nor receive quarter." His horse is about to leap a trench beside which the enemy's standard bearer has fallen in an effort to prevent his progress.

A few blocks beyond the Alameda, with the business district intervening, is the Plaza de Armas, once the center of the open-air social life of the capital. Even to-day there are certain evenings of each week when a large proportion of Santiago wanders there to see and to be seen. On one side of the square is the Cathedral, on another the post office and Government telegraph offices. The remaining two sides are occupied by arcades with picturesque shops.

There are walks around and through the Plaza, and during the evening promenade these are crowded with people on pleasure bent, always moving in two lines. Round and round they go, lovely young girls walking with their duennas, and the handsome young men, in their clothes of latest cut, usually in groups, the members of each line undisguisedly looking over and assessing the members of the other (see, also, illustration, page 224).

THE CATHEDRAL'S INTERESTING TREASURES

In spite of the watchful eyes of the mothers who bring their daughters to the promenade, which usually takes place on Thursday, Saturday, and Sunday evenings, Cupid seems to find the Plaza a delightful haunt.

The Cathedral stands on the site which

Photograph by Jacob Gayer

THE UNION CLUB IN SANTIAGO

This is Chile's most famous social organization. Dinner usually begins around 10 o'clock at night, and here a stranger may see Chilean society as nowhere else in the Republic. The club compares favorably with the best of Europe and America (see text, page 238).

Valdivia appointed for the erection of Chile's first church. It contains numerous paintings by old masters; a reclining, life-size figure of San Francisco de Xavier, carved from the trunk of a pear tree; a monstrance and altar of silver more than 200 years old; and a crystal chandelier which hung in the room where the first Chilean congress met. The organ is one of the finest in the world. It came to Chile by accident. The ship which was carrying it to Australia was wrecked in the Strait of Magellan; the organ was salvaged, purchased at a bargain, and placed in the Cathedral.

SEÑORA COUSIÑO'S SPLENDID GIFT TO SANTIAGO

Across the city from the Plaza de Armas is the Parque Cousiño, the Central Park of Santiago. It is about a mile long and half a mile wide, green with eucalyptus, acacias, poplars, magnolias, and myrtle and a great variety of shrubs, vines, and grasses. Here and there are charming little lakes and lovely flower beds. In the center is a parade ground, flanked by a grandstand, where military exhibitions and open-air assemblies are held.

In the autumn months, during the last two hours before sunset, it is thronged with automobiles and carriages, in which ride the beauty and fashion of Santiago. On Sunday one may see the *rotos* and their families gathering for their favorite dance, the *cueca*.

The park was presented to the city by Señora Isadora Cousiño, who, before she became the wife of the wealthiest man in the country, was the richest woman in

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THE CAPITOL OF CHILE

As constituted to-day, the Government of Chile has a President, a Chamber of Deputies, and a Senate. The President makes all civil and military appointments and conducts the foreign relations of the country.

Photograph by Jacob Gayer

TWO HORSES PULL A SANTIAGO CART AND THE THIRD TUGS IN AN EMERGENCY

The middle horse is in shafts, the one on the off side is hitched to a singletree slung from the axle. The saddle horse is hitched with only the inside trace attached to the breast collar.

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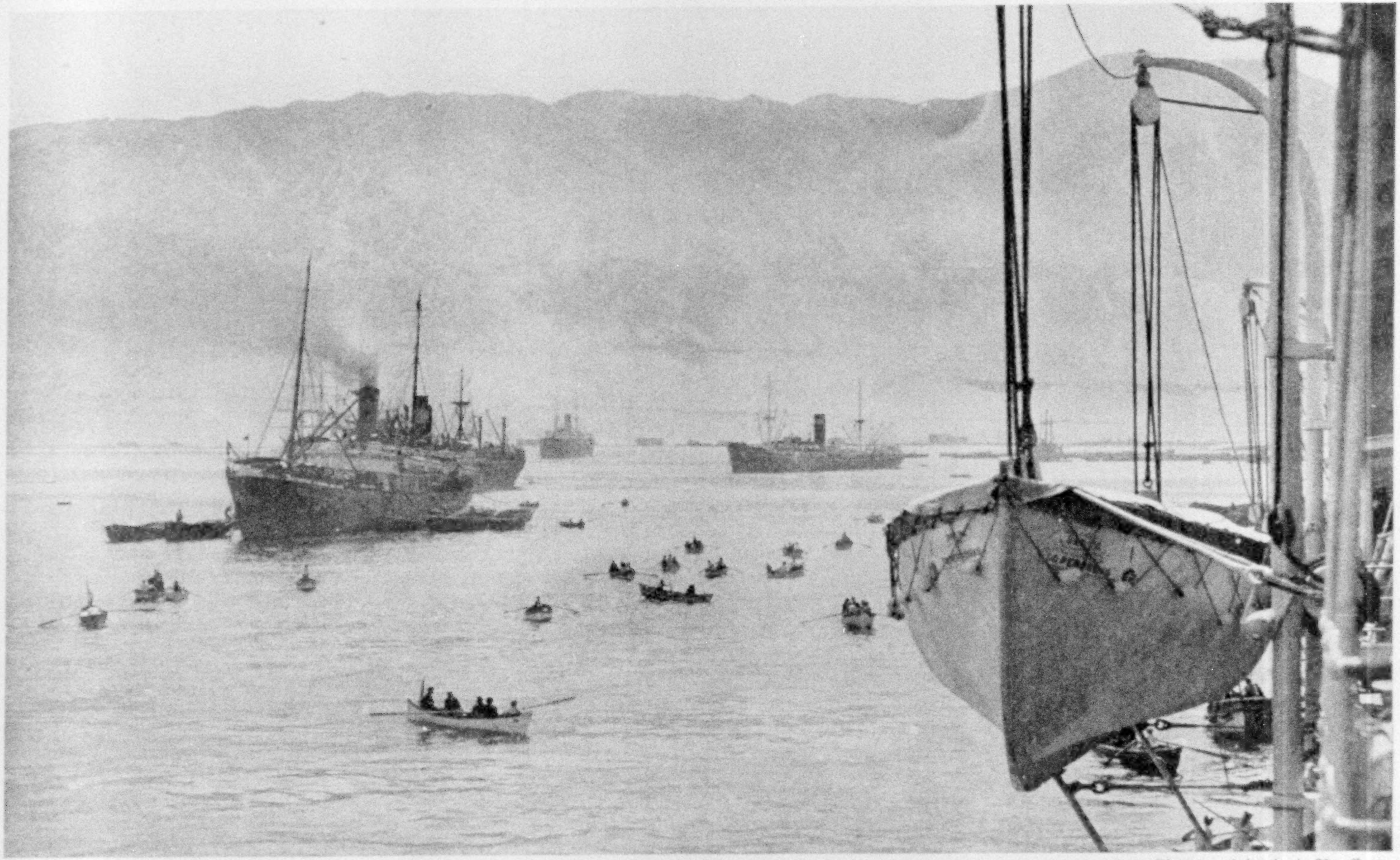
EL MORRO ROCK AND THE HARBOR OF ARICA

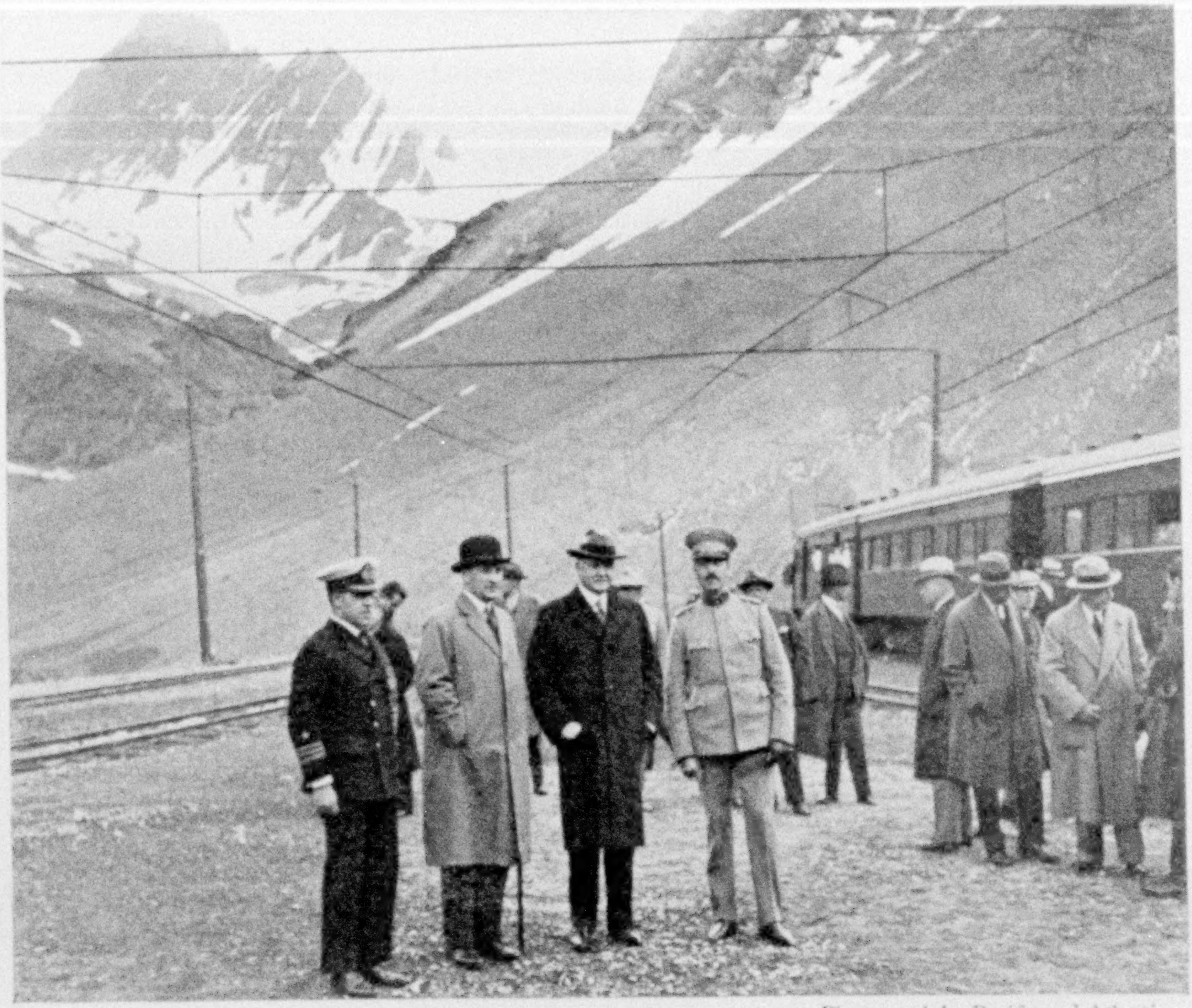
It was here that the great tidal wave of 1868 destroyed the United States store ship *Fredonia* with all on board, and swept the U. S. S. *Wateree*, on a wave 47 feet high, not including the comb, nearly two miles inland (see "Some Personal Experiences with Earthquakes," by Rear Adm. L. G. Billings, in the NATIONAL GEOGRAPHIC MAGAZINE for January, 1915).



Photograph by A. A. Hauff

IQUIQUE IS ONE OF CHILE'S LEADING NITRATE PORTS

The mountains in the background are treeless and as bare as a desert, and they stretch for hundreds of miles along the coast. Behind them lies the highland desert, containing the nitrate deposits which have brought ships from all parts of the world to Chile.



Photograph by Pacific and Atlantic

PRESIDENT-ELECT HOOVER SAYS GOOD-BYE TO CHILE

Capt. Gaston Neff, Naval Aide to the President of Chile; Felix Nieto del Rio, Undersecretary of State of Chile; Mr. Hoover, and Col. Carlos Gárfias, Aide to President Ibáñez, at Caracoles, the frontier station on the Transandine Railway.

Chile in her own right. When her husband died she was his sole heir. During her widowhood her expenditures were so lavish as to be famous even in Europe. Her residence in Santiago, built in Ionic style, is one of the finest in South America. It was decorated by the artist who was responsible for the embellishment of the Opera House in Paris. Her philanthropies have set a notable example, which is being emulated to-day by numerous rich Chileans.

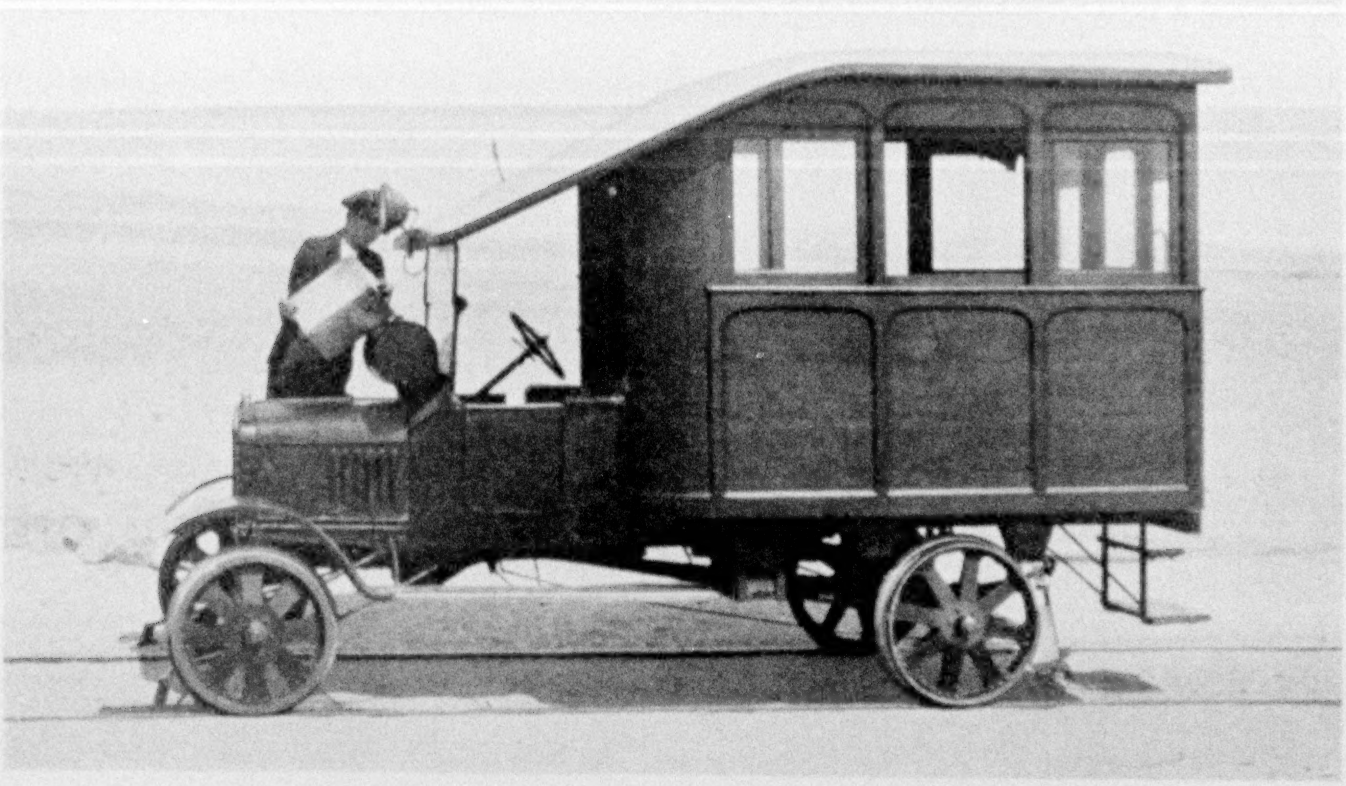
The Quinta Normal is another of Santiago's fair parks. Here center the interests of the Agricultural Department of the country, and one may study the flora and the fauna of Chile in all of its beauty and richness and contrast.

Not far away is the Parque Forestal, bordered on one side by the canalized Mapocho River and on the other by a boulevard where some of the noblest houses of Santiago face the park. Among these is the American Embassy, and one who has visited practically all of the capitals of Latin America feels a thrill at finding in Santiago one place where his country's representative is adequately housed in a government-owned structure. This splendid residence was built by a rich Chilean engineer residing in New York. Through the fortunate and timely coöperation of some patriotic Americans resident in Chile, its acquisition at a little more than half its real value was made possible.

In 1926 Chile was visited by a series of earthquake shocks. They left the embassy entirely unharmed, but the chancery was badly shaken and cracked.

ART TREASURES OF CHILE

One of the beautiful buildings in the Parque Forestal is the National Museum



Photograph by Jacob Gayer

A MODEL T OF THE RAILS

Many an automobile chassis has been made to do service for small-unit transportation on South American railroads. This one, on the Tacna-Arica Railway, makes remarkable time when the not-too-conservative Chilean chauffeur "steps on the gas."

© Publishers' Photo Service

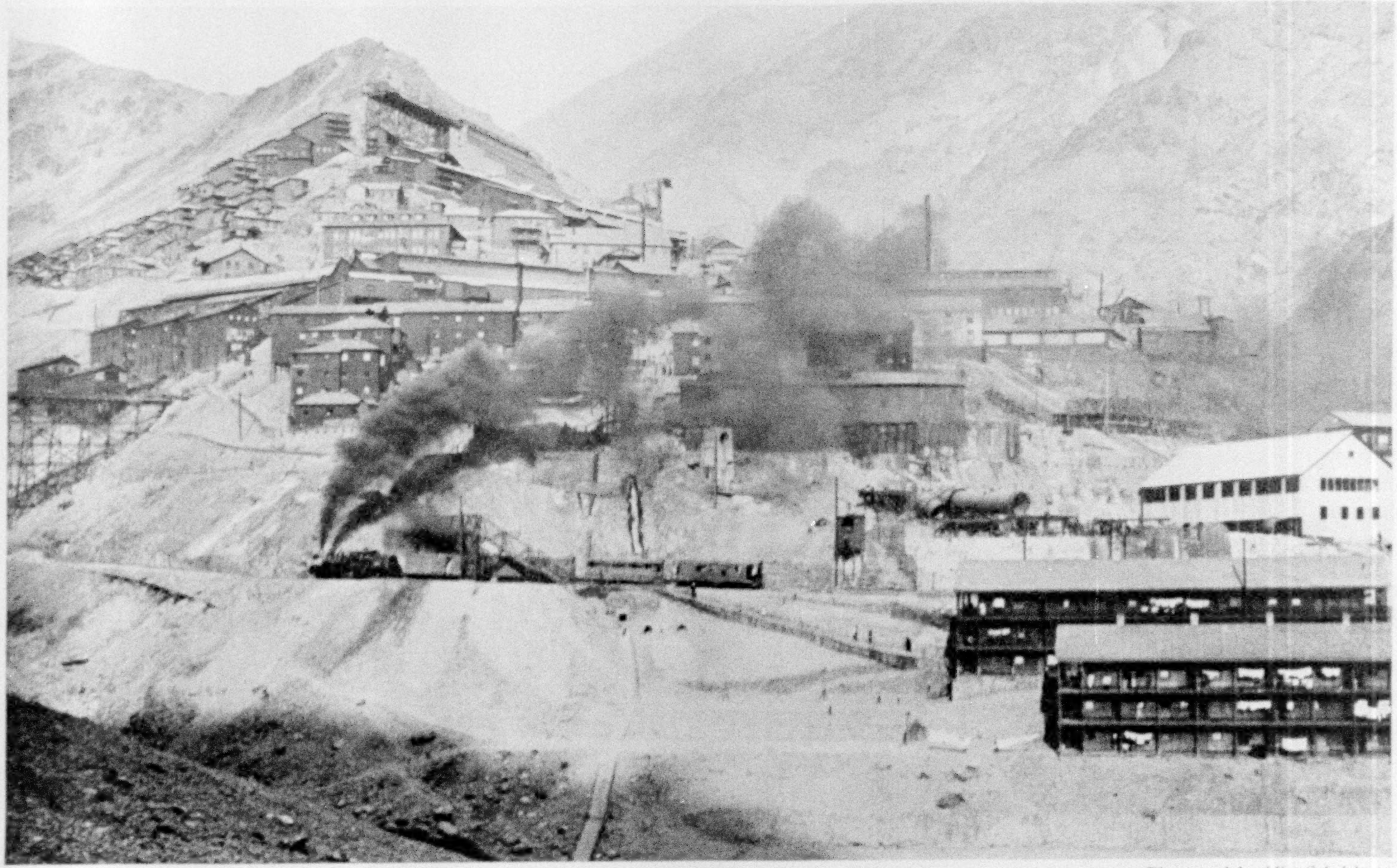
LOADING DRIED NITRATE INTO CARS AT A CHILEAN PLANT

The decline of the nitrate industry after the World War brought hardships to many Chileans, financial straits to the Government, and distress to the plant owners. Chile's nitrate output fell from 57.6 per cent of the world's total in 1913 to 25.7 per cent in 1926. But lower prices brought rejuvenation to the industry, unemployment ceased, and in 1928 the Government received 23 per cent of its total income from the nitrate tax.

Photograph from International Newsreel

THE TWIN FALLS ON THE RIVER LAJA

Chile has a wealth of undeveloped water power. The proximity of the high Andes to the sea causes many of the rivers to have a rapid, even torrential, current, with a resulting potential white-coal district equal to any in the world. The Laja is a tributary of the Bio-Bio, the most important river in Chile, which enters the sea at Concepción.



Photograph by Alice Schalek

THE BRADEN COPPER MINE AT SEWELL

Chile's copper exports are exceeded in value by nitrates only. This great mine, shipping 7,000 tons of copper bars a month to the United States, is located two miles above sea level, in the heart of the high Andes. The ore veins are 3,000 feet beneath the surface and the ore yields 2½ per cent pure copper. The mine employs 7,000 people. Answering a recent appeal for lower taxes against the copper companies, the Chilean Government declared that 90 per cent of the industry was in foreign hands. Production has increased tenfold in fifteen years, bringing in many millions of dollars to swell the rolls of the profitably employed and to increase the national revenues.

© Publishers' Photo Service

HANDLING COPPER BARS AT ANTOFAGASTA, CHILE

Copper and nitrates constitute the bulk of Chile's exports. The product of the great smelters at Chuquicamata is shipped to the outside world from Antofagasta, where it is loaded on vessels from lighters (see, also, text, page 245).

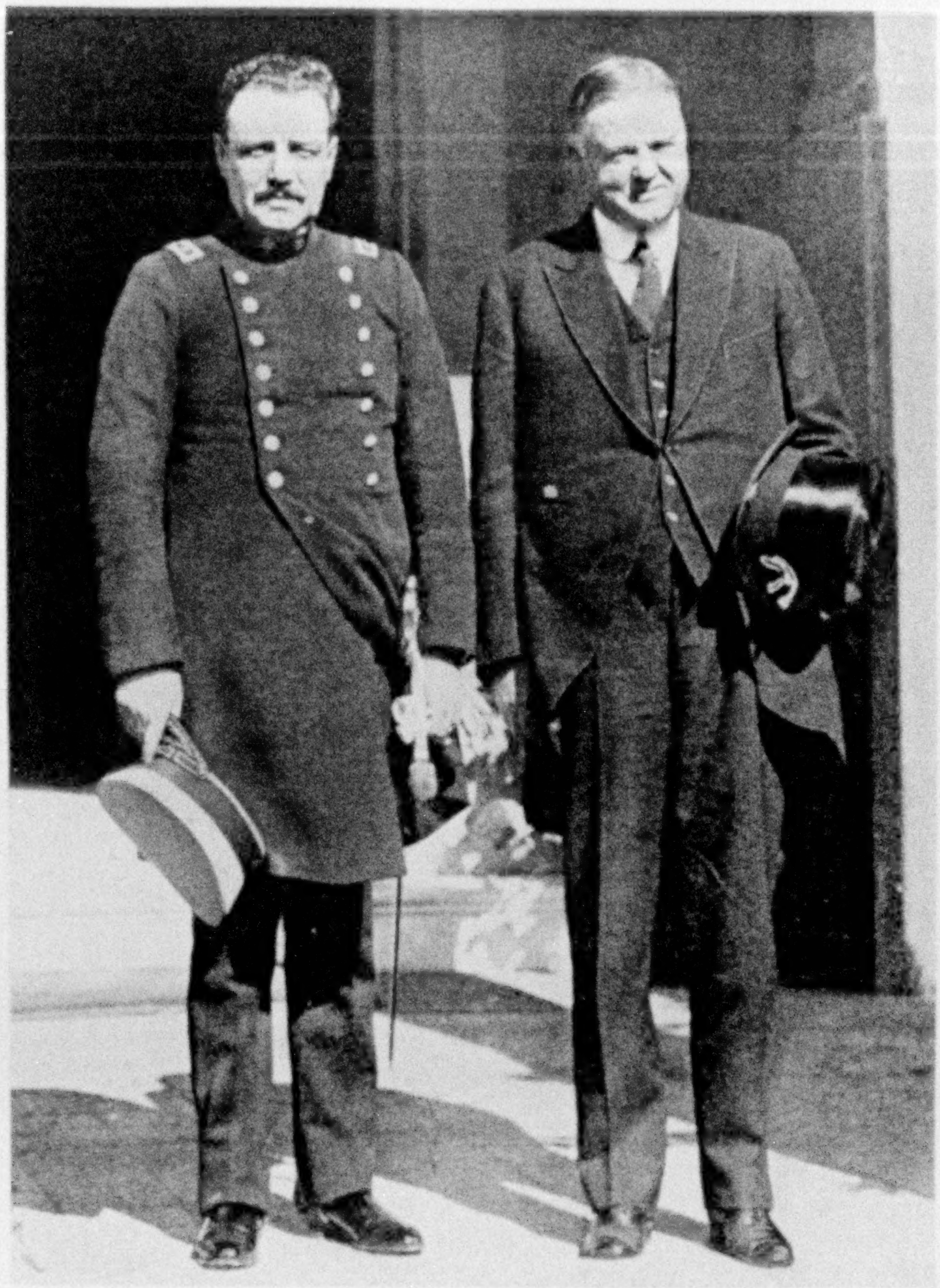
of Fine Arts. It houses one of the best collections of paintings and sculptures in South America, embracing the artistic jewels of four centuries of Chilean civilization and many of the treasures which the Chileans found in Lima when Peru was occupied, at the end of the Nitrate War. At that time Peru had collections that had been started in the days of Pizarro and augmented under the viceroys, so that they included works of many of the old masters of Europe. These were among the reparations levied by Chile during the occupation (see Color Plate II).

The official residence of the President of Chile is in the Palacio de Moneda, which covers an entire square and has two large patios. It is a severely plain Spanish structure, coming directly to the sidewalk on all sides. Tradition says that by a curious mistake the plans for the palace, which were intended for a government house in Mexico City, reached Chile instead and so pleased the Chileans that they decided to use them.

In the environs of the city rises the Cerro San Cristóbal to a height of about 900 feet. Years ago it stood out in lonely grandeur on a bare plain, but the city began to grow and presently it became a towering island in a sea of houses.

Under the skillful treatment of landscape engineers, San Cristóbal is emerging into its own. A new zoölogical garden will be one of the features of the mountain. A fine winding roadway carries one round and round to the summit, but an aërial cableway provides a shorter and easier means of reaching the top. On a prominent bluff, just a little below the apex, stands a colossal image of the Virgin with arms outstretched toward the city, as if in blessing.

As one looks down from San Cristóbal's heights, to the west lies the checkerboard city and almost at one's feet the lesser



Photograph by International Newsreel

"HANDS ACROSS THE AMERICAS"

President-elect Herbert Hoover, of the United States, and Gen. Carlos Ibáñez, President of Chile, photographed in Santiago.

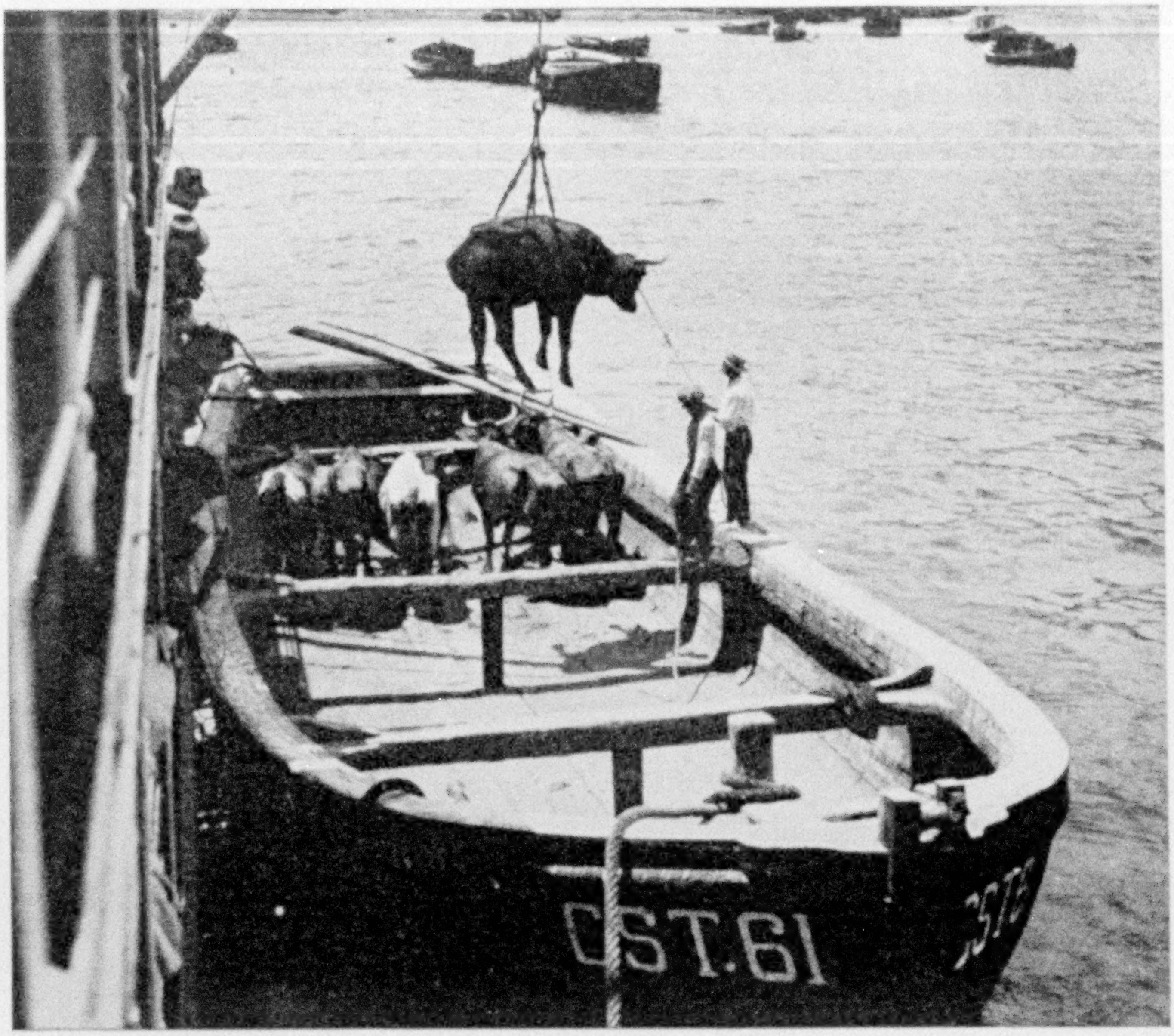
hill, Cerro Blanco. Here are the white monuments and mausoleums of the cemeteries flanked by the three great hospitals—Alemán, San José, and San Vicente de Paúl. There stretches the silvery ribbon of the Mapocho, bordered by the ever-green Parque Forestal. To the east is the subdivision of Providence, with its Swiss chalets and English-looking houses and gardens, and beyond them the Santiago Golf Club.

A cemetery may be a strange place to go for a thrill, and yet the Cemetery General of Santiago is in fact what all cemeteries are in figure—a city of the dead. At the entrance is a semicircular plaza with a colonnade. The gateway is surmounted by a lofty dome, which bears a fine colossal group of statuary representing Adam and Eve mourning the death of Abel. In the corridors of the entrance are painted ceilings and leading off from the corridors a stately chapel.

Entering the cemetery, one walks down broad streets, which are transformed by magnificent trees into green aisles. Here are orange trees, magnolias, and Brazilian rosewoods; there tall and stately cypress. The streets run at right angles. Many of them are lined with beautiful vaults and rows and rows of chapellike tombs, where sleep the distinguished dead of many generations. Statues, columns, and memorials of great variety are on every hand.

Here is a memorial to more than 2,000 victims of the great Compañía church fire of December 8, 1863, when a gorgeous fête to the Virgin was in progress. Yonder is the marble tomb of O'Higgins (see text, page 227), and beyond is the bronze bust, on a black marble column, of that distinguished Chilean man of letters, Andrés Bello.

In the months when the roses bloom, such is the wealth of color and beauty that travelers from all parts of the world have paid tribute to the beauty of the Cemetery General. Masses of white blossoms grow on great vines which sometimes climb 30 feet over trees and tombs. At the festival of All Saints, November 1, all Santiago gathers for Memorial Day, and flowers in inconceivable numbers, both in sprays and formal pieces, are brought to the cemetery, for even the poorest may take part in its decoration, since the cost of flowers in Santiago is negligible. When



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LOADING CATTLE AT COQUIMBO

When the weather is rough it is difficult to make the transfer of live stock between docks and ships. Sometimes the cattle are hoisted aboard in slings, but it is not unusual for a rope merely to be looped around the horns and the animal lifted by the neck. Thus raised, a steer will hold as still as a kitten lifted by the nape of its neck.

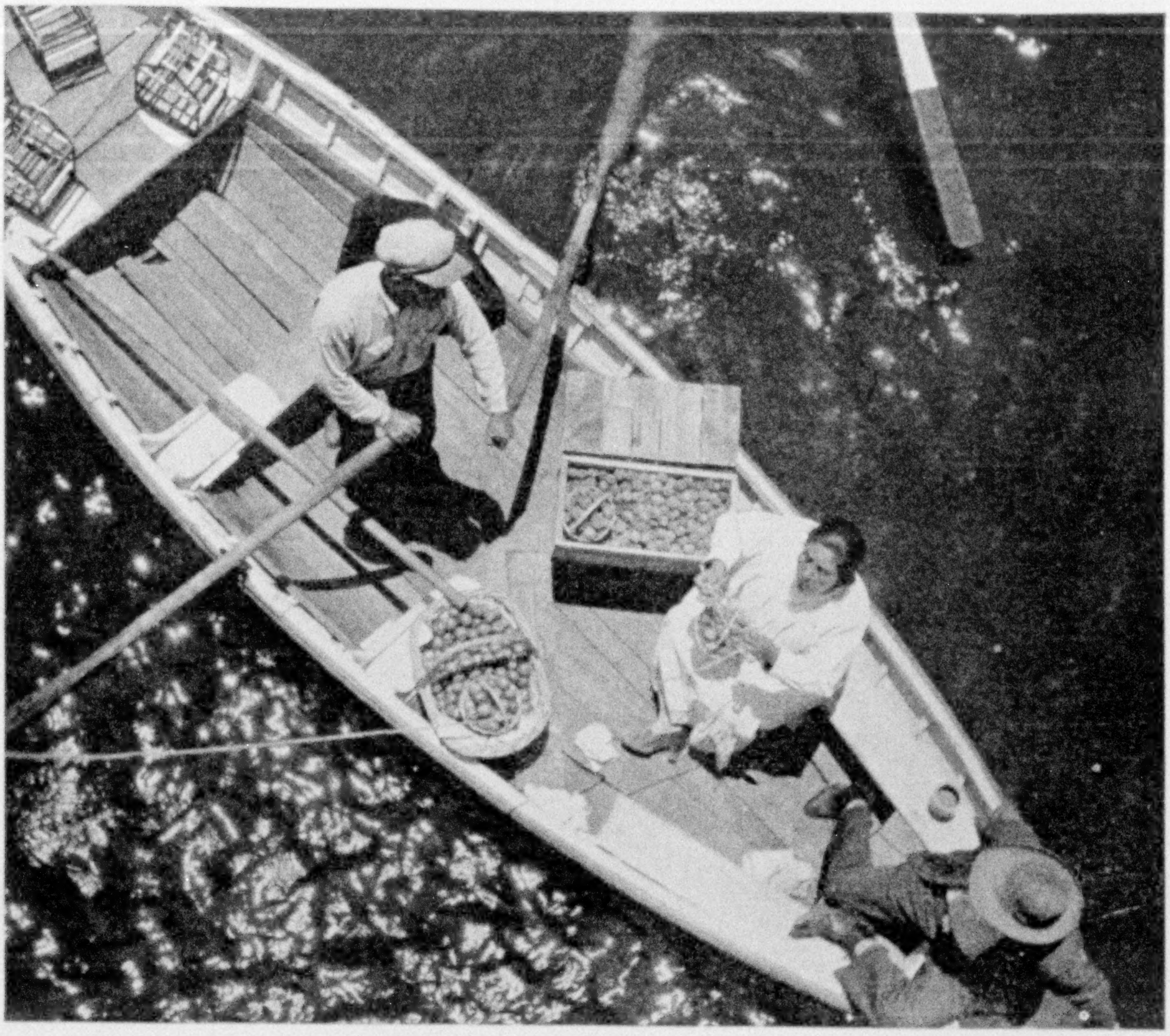
the day is done the vast cemetery is one veritable floral bower.

THE BRILLIANT SOCIAL LIFE OF SANTIAGO

The social life of Santiago is brilliant and vivacious. Most of the wealthier residents have vast haciendas, which yield large profits because labor costs are extremely low. Consequently, they are able to own city homes of the most luxurious type and to entertain with a lavish hand. The upper-class Chilean has traveled extensively, has studied abroad, and not uncommonly speaks both French and English fluently. Old Spanish conventions still control the relations between the sexes.

The new Union Club has become the social center, and Santiago has much justification for the extravagant pride with which it contemplates its splendid new clubhouse. Dinners usually begin about 10 o'clock, and here one may see the débutantes and their younger sisters as perhaps nowhere else in the city.

The poor, too, in spite of their drab existence, have the numerous holidays to thank for their opportunity to extract some fun from the routine of life. On these days the two-wheeled cart of Chile, the *carretela*, is seen everywhere filled with happy families, who take their household chairs along for seats, strap the table, legs upward, to the top of the vehicle, and carry their babies, their well-worn guitars, their baskets of provisions and demijohns of cheer along. Pots, pans, lamps, blankets, and bedding sometimes go with them, be-



Photograph by Jacob Gayer

A BUMBOAT MEETS A LINER AT COQUIMBO

The high Andes come out close to the sea at Coquimbo, a beauty spot on the Chilean coast. Their snow-crowned heights delight the eye of the traveler who for a week has gazed at nothing but the desolate shores of the nitrate belt and the guano district. Here, too, the soil is clothed with green. The bumboat folk come out in force, with fruit, love birds, monkeys, and handicraft products for sale. A basket of fruit is being made fast to a rope, so that the purchaser, a passenger, may draw it up the liner's side to the deck.

cause when they get two holidays together they spend the night in the open.

There is a native soup known as the *cazuela*, a mixture which contains practically everything necessary for a satisfying meal. Ordinarily this soup constitutes practically a full meal in the homes of the poor, but when feast days arrive they are feast days indeed, when there are *empanadas* (meat pies), *porotos* (beans), *sopaipillas* (pastry), and other national delicacies.

Some one has remarked that when Chile wants to rear a statue to her outstanding national hero it will be that of a half-caste Chilean roto, who has done the work and fought the battles of his nation since it stepped from its swaddling clothes, and who is able to work harder and longer on less food than almost any other human being. One who observes the roto's childlike spirit and his ability to smile with fewer creature comforts than almost anyone else in the world cannot help but feel that there is much justice in this characterization.

This roto has been described as powerful, law-abiding, fearless, immoral, and occasionally drunk, but imbued with a dauntless spirit and blessed with a sense of humor.

THE PITIABLE PLIGHT OF THE ROTO'S CHILDREN

The word "roto" itself proclaims the urban laborer's condition; it means "the broken one." All through Latin America

Photograph by Jacob Gayer

A FOREST OF POPLARS NEAR LONTUE

With cheap labor, forestation becomes profitable in Central Chile, and the plantings that the *hacendados* have made have served to convert this region from a treeless land to a well-wooded district. This poplar forest was planted by a wealthy landowner as a source of wood from which to manufacture crates and boxes for his grapes.

the terms that the upper caste applies to the laborer eloquently proclaim the pathetic conditions under which he lives.

As I wandered around the environs of the city where the rotos and their families dwell, I saw thousands of little one-room shacks made of discarded remnants of corrugated iron, pieces of boxes, and such, with bare ground for a floor, no windows, and a bedraggled piece of burlap for a door. The children, though it was in the dead of winter and cold—that kind of cold which creeps through the warmest clothing—played around a few sickly embers, the remains of a brushwood fire. Their little arms and legs, noses and cheeks were bare and blue, and their bodies were covered with mere masses of rags, apologies for clothing.

At birth, the average child in the United States has 58 years ahead of it. The average child in Chile has only 30 years. More than one-fourth of all the children born in Chile die before reaching the age of one year, and half of all the deaths of the country are among children under six years of age.

Had she, during the past 50 years, profited by the experiences of many other nations in the care of her children and the reduction of her death rate, Chile to-day would be a nation of more than seven million people instead of less than four million.

Recently the nation awakened to the fearful consequences of her lethargy in the conservation of her human resources. She called Dr. John D. Long, of the United

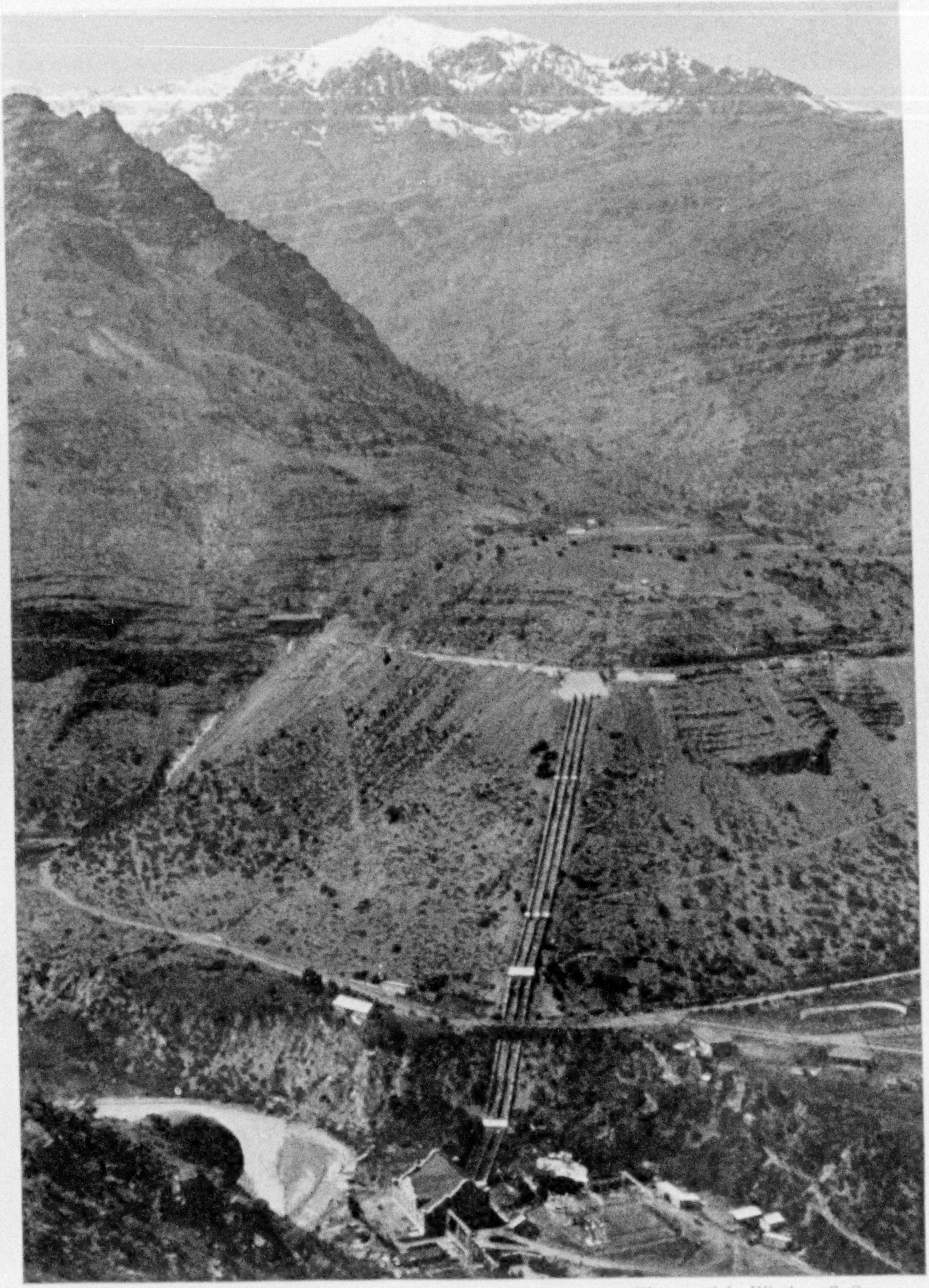
HARVESTING GRAPES AT LONTUE

When the traveler goes through the heart of Chile he is reminded of the inland journey from Los Angeles to San Francisco, except that the oxcart takes the place of the light truck in moving the products of garden and vineyard.

Photographs by Jacob Gayer

A PRUNE ORCHARD NEAR MOLINA

The products of Chile's groves, orchards, and truck farms are ready for market in North America and in northern Europe when the crops in those countries are at low ebb. With the standardization of fruit packs and the development of refrigerator ship service, the South American export trade will grow.



Photograph by Winthrop S. Greene

WHERE MELTING SNOWS ARE TRANSMUTED INTO LIGHT AND POWER

Maitenes is the hydroelectric center for Santiago and Valparaiso, as well as for the State and Transandine railways. The plant is situated on the Colorado River, whose flow is so swift that the development of a settling basin to eliminate the sand from the water was necessary. The overflow waters do not pass again into the Colorado River, but into the stream of another canyon (see, also, text, page 245).

© Publishers' Photo Service

WINE JARS AT LOS ANDES, LARGE ENOUGH FOR ALI BABA'S FORTY THIEVES

Situated in a little mountain-cloistered stretch of the Aconcagua Valley, Santa Rosa de los Andes—to give the place its full name—is the western terminus of the Transandine Railway, a famous health resort, and a wine-producing center.

States Public Health Service and one of America's foremost sanitarians, to make a survey of her situation and to advise her in framing a modern sanitary code. Dr. Long, a learned Spanish scholar, was given every coöperation by the Chilean physicians, with the result that there was formulated a code suited to the country's particular needs and along lines which, in Argentina, for instance, have produced a death rate only half as high as that now obtaining.

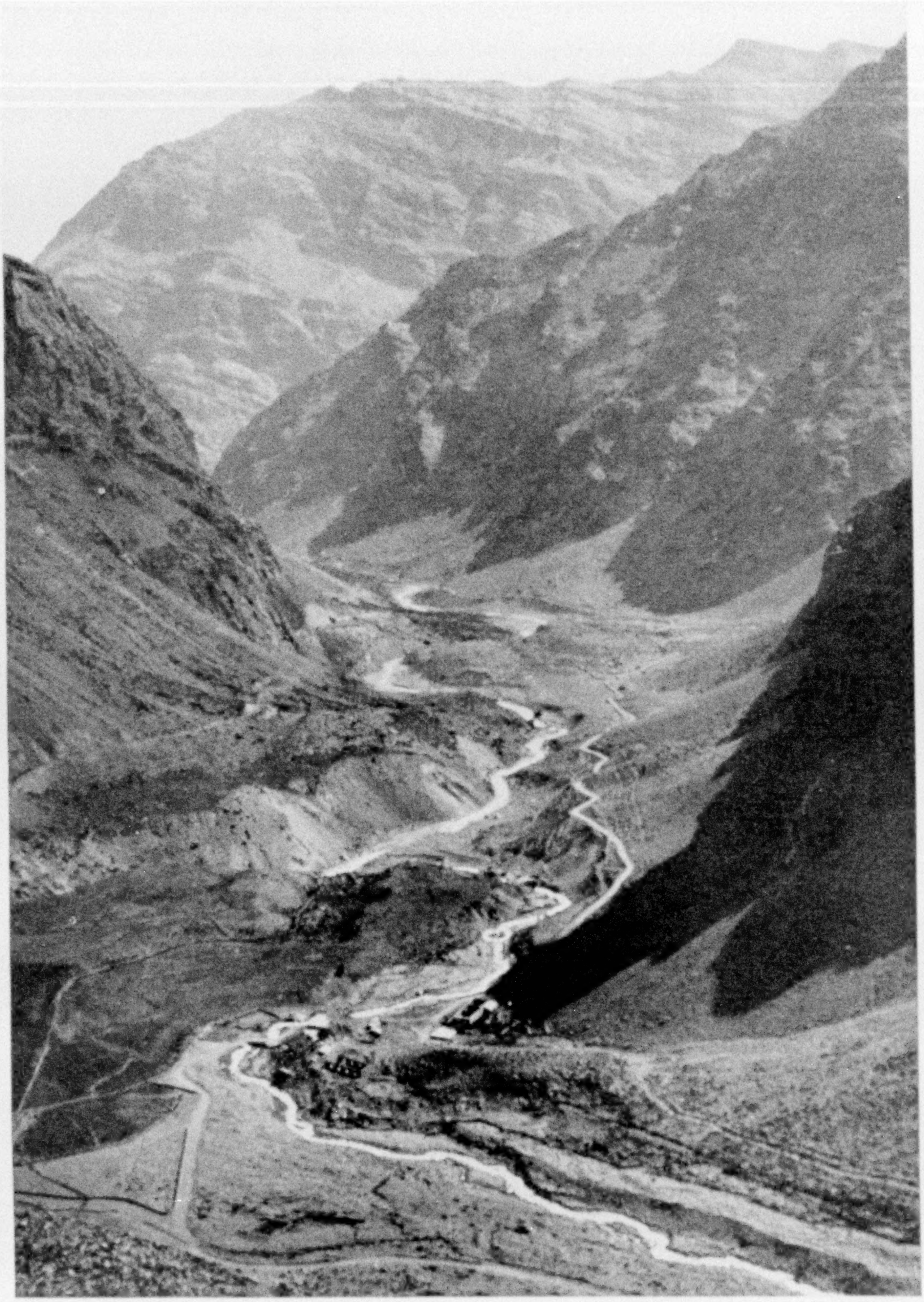
SANTIAGO'S SPLENDID RACE TRACK

There is probably no place where one finds such a striking cross-section of the Chilean populace as at the Santiago race track, and certainly no race course in the world has a more striking situation. There are three magnificent grand stands of concrete, one of which is for the stockholders of the Jockey Club and their friends, a second for the élite who are neither stockholders nor their guests, and a third for the roto and the *inquilino* of city and country, respectively. Everybody and everybody's friend seem to be there on Sunday afternoon, to watch the racing for which Chile is famous.

There is the oval running track, a steeplechase course, in the shape of a figure eight, inside the main track, and splendidly kept turf everywhere. Flocks of sheep graze about in leisurely fashion, and the stockholders receive their dividends in the shape of nice fat lambs. The flower beds about the paddock are among the most beautiful to be found anywhere. The landscape gardener has left nothing undone to provide a beautiful foreground, and the summits of the Cordilleras, wrapped in eternal snows, form a background that fairly competes with the races themselves in immediate interest.

CHILE'S MARKETS SPEAK OF HER RICHNESS

The native Chilean horse is of Arab strain, short-bodied, but with powerful legs. He is docile and intelligent, but high-spirited withal. He needs to be an animal of great courage, for many of the roads of Chile are both rutty and hummocky, ankle-deep



Photograph by Jacob Gayer

LOOKING DOWN THE VALLEY OF THE ACONCAGUA

The Aconcagua River, flowing down from the crest of the Western World, has chiseled out a valley which for ruggedness and grandeur has few equals. Gradually a motor road is pushing its way farther and farther toward the head of the valley. The detritus deposits at the base of the cliffs on either side of the stream provide an object lesson as to how valleys grow wider and mountains grow lower, as the ages roll on and the waters continue to flow.

in dust in summer and knee-deep in mud in winter.

A better-roads movement has been launched, however.

The public markets of Santiago are a revelation to the visitor. At the flower market one can find every variety of bloom for which Chile is famous (see Color Plate XI). Such roses I have never seen except in Montevideo. Among the wild flowers are the copihue, the rosy bell of a slim vine clinging to trees in the southern woodland; the flaming *Tropæolum speciosum,* which mantles the hedgerow; the brilliant blue crocus, that lies in sheets on Andean foothills; the turquoise and golden puyas, which form a striking feature of many a Chilean landscape.

There are two general markets. To one go the ladies who do their own marketing. It is a typical South American market, having not only meats, vegetables, and other produce, but all kinds of wares—horsehair baskets, cages of love birds, and the like. Here are great strings of tiny species of birds, ready to form the base for some sort of soup. There are quivering piles of tiny transparent larvæ of native fishes which will go into another type of soupy concoction.

But whoever fails to see the other market, across the river, where milady seldom goes, but where her maid usually shops, misses one of the most interesting sights in South America; for here comes an innumerable train of high-wheeled carts and wagons, bringing the finest assortment of fruits and vegetables this writer has ever seen: oranges and lemons in profusion, carrots and cabbages by the load, that are of blue-ribbon-winning size; berries, plums, grapes, and pears seemingly intent on breaking the record for lusciousness. All of these proclaim the richness of the soil and the perfection of middle Chile's climate.

A CANAAN IN THE ANDES

One would like to turn aside and visit the hydroelectric plants of La Florida and Maitenes, where the water from the melting snows of the Andes is transformed into the electric power that moves the trains between Santiago and Valparaiso and across the Cordilleras. I visited them on a Sunday with the American engineer who planned the Maitenes plant, after having built the big installations at Guanajuato, Mexico, and after having developed high-tension transmission by the erection of steel towers, suggested by the familiar steel windmill derrick—an engineering departure that has increased transmission voltages perhaps tenfold.

The road from the Santiago Valley to the Maitenes power plant is many miles long. As one motors across the nose of a ridge which incloses the little plain and looks down upon a miniature community nestling at the base of the main mountain, he beholds a scene of transcendent beauty. All of the workmen's cottages, the guest lodge, the superintendent's houses, and the power structures are built of gray concrete, with red tile roofs, and trimmed with white (see illustration, page 242).

This little Canaan of green, with its delightfully contrasting buildings, surrounded by mountains that run the gamut of the color scale, and all overlooked by the majestic white-clad Cordilleras, makes a picture that would thrill the most blasé traveler.

Here the housing conditions of labor were many hundred per cent superior to those enjoyed in native circles. These communities everywhere seemed to me to be lighthouses of hope for the masses of Chile.

COPPER COMPANIES PROVIDE MODERN HOUSES FOR WORKERS

At the great copper mines of Chuquicamata the traveler also finds excellent housing conditions. Here is a modern industrial city of 20,000 inhabitants, with "every convenience of civilized life, in a region that can barely support a dozen blades of grass."

Chuquicamata is an outstanding monument to enterprise and industry.

The mine brings its power from the coast at Tocopilla, where it is generated from imported coal, and brings its water supply in three pipe lines run through the Cordilleras on the Bolivian border. Twelve thousand tons of sweet, cool water are delivered to Chuquicamata every day. From the loading tracks at the smelter 210,000,000 pounds of copper are sent every year to the brass works and wire

Photograph by Publishers' Photo Service

A SNOWPLOW BATTLES ITS WAY THROUGH THE DRIFTS ON THE TRANSANDINE

With all the most modern equipment for warring against snow, and with scores of snowsheds at critical points, the Transandine still has a heavy task to keep the road open in winter.

mills of the industrial world and thence to the four corners of the earth.

The mine itself is older than Chilean history, for it was worked by the native Indians many centuries before the advent of Almagro; but it was not until 15 years ago that it was made to bring real life to this stretch of the Atacama Desert.

The operating company appreciates full well the costliness of a force of hard-bitten, floating workers, and it realizes that the long-run success of the enterprise depends on permanent laborers, well fed, well housed, and well trained. Consequently it has spent millions of dollars in laying out streets, erecting concrete houses and providing schools, hospitals, motion-picture houses, and everything that is conducive to the well-being of the working force.

BYGONE CONDITIONS AT CHUQUICAMATA

The memories of the past at Chuquicamata are those of one of the wildest mining camps in the world. Old-timers sit at the beer tables and tell of the turbulent days. They tell wild tales of Placilla, the empty houses of which are still standing immediately above the mine—tales of shooting and stabbing, of almost every known form of vice and violence; for not a man, woman, or child in Placilla's large cemetery is supposed to have died a natural death.

"Punta de Rieles still flourishes, although to a diminishing degree. It still receives its quota every pay day and sends its quota of damaged goods to the hospitals for repair and to the church for final rites; but the increased vigilance of the carabineros and the decrease of its population as compared to Chuquicamata's growth are ever lessening the damage Punta de Rieles is doing."

My farewell to Chile was one that will long be remembered. Our train left Santiago in the rain and ran to Llay-Llay. There two cars were detached, and in these we proceeded to Los Andes. There, in the foothills of the Andes, with the roaring Aconcagua River running past the station, we transferred to the Transandine narrow-gauge rack-and-pinion railway that was to carry us to Mendoza, in Argentina.

At Rio Blanco the climbing began in deadliest earnest. No word picture gives any conception of the grandeur of the towering, snow-clad peaks. From there to the entrance of the summit tunnel at Caracoles lies what veteran travelers regard as perhaps the grandest rock scenery in the world.

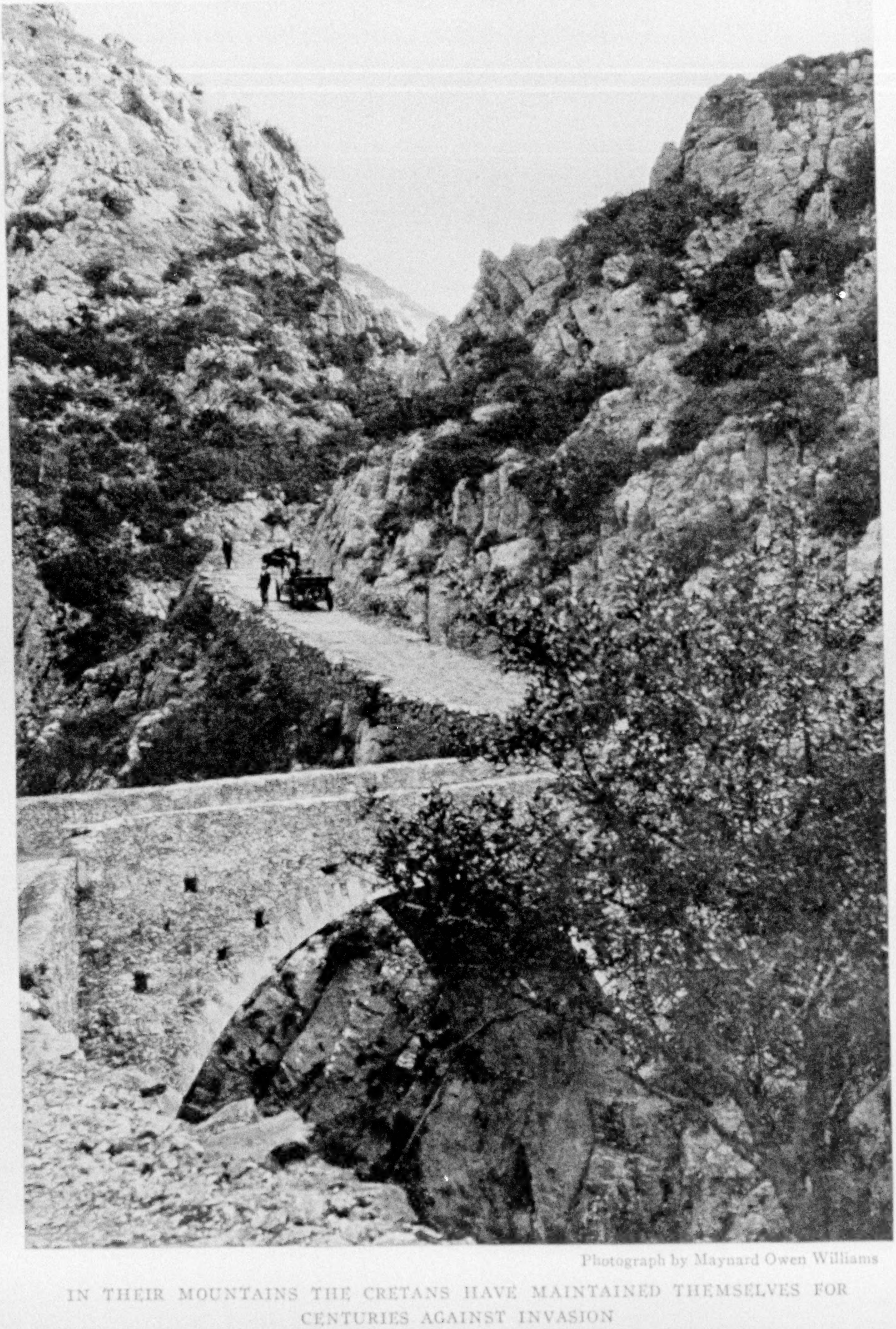
As our train puffed up those heavy grades, the side walls of the cars now and again rubbed against the packed snow on either side of the track. Here a sickly sun peeped through the clouds, there we were wrapped in dreary solitude by impenetrable mists, and elsewhere we could look down to the track over which we had just come, several thousand feet below. When we reached the summit tunnel the clouds settled down firmly over us.

In the middle of the tunnel we crossed the Continental Divide, and my hopes of seeing Aconcagua again sank to zero; but as we emerged from this burrow through the mountains the fogs and clouds, the mists and the rain, had vanished. The Argentine side offered no abiding place for them. It was as cold and crisp here as it had been foggy on the Chilean side.

VALE, ACONCAGUA!

As we came down a little way we crossed a high bridge over a river that joined the main stream which we were skirting, and as we looked northward there stood Mount Aconcagua again, in all her glory.

The western sun had disappeared below the horizon and had written the shadows of the dividing ridge on the buttressing mountains to our right; but the last 10,000 feet of Aconcagua's heights, towering above her neighbors as a mountain above a mole hill, were bathed in sunshine. Her robes of spotless snow were trimmed with the silvery sheen of eternal glacial ice. Over her floated a white cloud of the size and shape of her head, and the rays of the evening sun, turning it to gold, made one feel that Nature was pressing the shining crown of the ages upon the brow of the mountain queen of the Western World.



Photograph by Maynard Owen Williams

IN THEIR MOUNTAINS THE CRETANS HAVE MAINTAINED THEMSELVES FOR CENTURIES AGAINST INVASION

By far the greater part of the island is occupied by mountain ranges, and their inaccessibility has greatly influenced its history. This bit of trail, between Candia and Neapolis, is not so bad as mountain trails go, but timid souls frequently prefer to walk up than take a chance with an automobile (see Color Plates I and VII).

CRUISING TO CRETE

Four French Girls Set Sail in a Breton Yawl for the Island of the Legendary Minotaur

By Marthe Oulié and Mariel Jean-Brunhes

THREE weeks before the date fixed for our departure we had not yet found a boat. The crew was ready, awaiting only a telegram. We were, however, somewhat scattered. The captain, Hermine de Saussure, was working along the coast of Provence; the mate, Ella Maillart, was cruising on an English yacht, in the Channel; the commissary-doctor, Yvonne de Saussure, was directing her school of dramatic art in Geneva, and the seaman-boatswain-cook, Marthe Oulié, was harvesting her hay in southern France.

At last, the 51-year-old motorless Breton yawl *Bonita* was found in the hands of her thirtieth owner, and in less than three weeks she was repaired and outfitted by the crew, which had assembled at the Vieux Port (Old Harbor) of Marseille, where large sailing ships are becoming very rare, alas!

On July 7 we passed under the Transporter Bridge on the way to Ajaccio, Corsica.

In order to reach Ajaccio it was necessary to touch at Porquerolles, in the Hyères Islands, which resembles a beautiful forest of pines planted in the midst of the sea. Here a Provençal tartan, a small coasting vessel of the Mediterranean, offered us a bouillabaisse, and under the chaperonage of an old, retired seaman, affectionately called "the admiral," we had a delightful party on board an Italian brig anchored in the roadstead. What a memory to cherish is that of those Italian songs, sung by superb male voices, with the melodies rising, from the group around the captain, at the foot of the great mast, to "the cruel and divine heaven of voyages"!

THREE PLAY WHILE ONE OF THE CREW STANDS WATCH

The western Mediterranean greeted us with disheartening calms alternated with squalls. We took three days and four nights to cover the distance between Porquerolles and Ajaccio, and a sort of tradition seemed to establish itself. Regardless of the length of a trip, it was almost invariably made in three days and four nights. This meant three days and four nights of open sea, absolute liberty, no land, and often without a ship in sight—days when the routine of the boat, the preparation of the meals, and the navigation were all that occupied the passing hours.

We took turns at the helm, eyes fixed upon the compass and upon the sails. One person was generally sufficient for a watch. She could steer and manage the sheets alone, while the trio off duty lounged on the deck, in the cabin, or in the cubbyhole, below and forward. But whenever the breeze freshened, everyone was needed to work the ship.

A British officer, a writer of note, asked us with astonishment: "But is it possible that you did not get bored, just the four of you, during two months?"

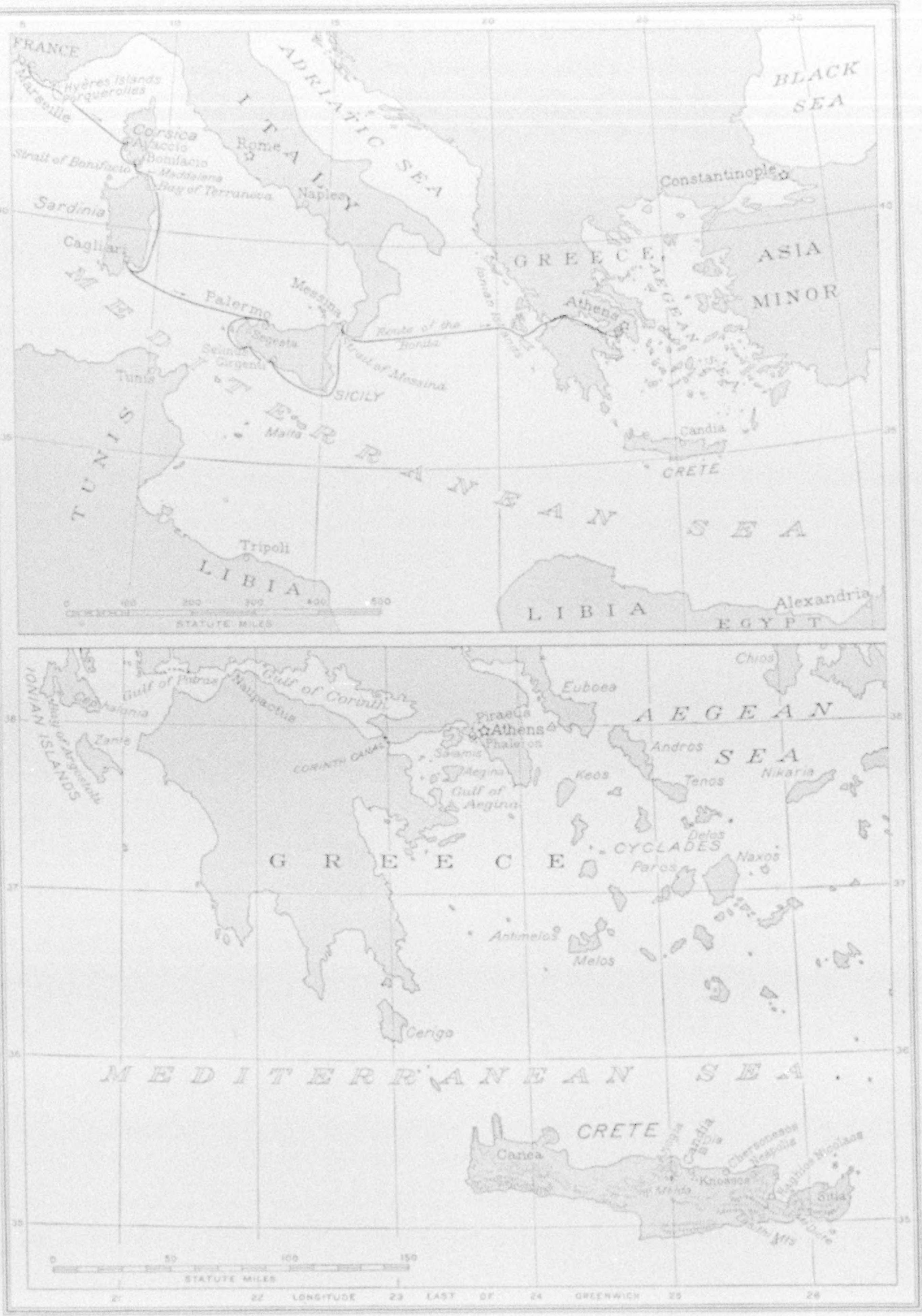
"Such an idea never entered our heads. How could one be bored in this solitude, without vexations, with so much work, so much of the unlooked for, and with so many charming hours of reading aloud or of lively conversation?"

"Well," said he, "I cannot imagine four young Englishmen who in any case could thus amuse themselves in each other's company. At the end of several days they would be bored to death."

He did not say whether his observation was based primarily upon the supposition of their being English or merely men.

Of Corsica we saw only Ajaccio and wild Bonifacio, and these only in glimpses.* Ajaccio, with its palm trees, has an African aspect, and everything about the port suggests Napoleon, who was born there. Even the smallest boats in the harbor have names which recall the Empire.

* See, also, "The Coasts of Corsica: Impressions of a Winter's Stay in the Island Birthplace of Napoleon," by Maynard Owen Williams, in the National Geographic Magazine for September, 1923.



Drawn by A. H. Bumstead

A MAP OF CRETE (BELOW) AND THE ROUTE OF THE "BONITA" (ABOVE)

One of the young authors was a member of the crew of the Breton yawl which sailed from Marseille to Athens by way of Corsica, Sardinia, Sicily, the Ionian Islands, and through the Corinth Canal, reaching Phaleron after a voyage of nine weeks. Travels in Crete were chiefly by donkeys and along the shore on a coasting vessel.

Bonifacio is an eagle's nest perched on a high cliff, inclosed by fortifications and containing a hodgepodge of once splendid, now dilapidated, structures.

IN FORBIDDEN WATERS

As we crossed the Strait of Bonifacio, bound for the eastern coast of Sardinia, we happened into the forbidden waters of the fortified Italian island of Maddalena, which occupies an important strategic position. It was here that Nelson lay in wait for the French fleet.

An alarm is given! On land semaphores are put in motion, warning booms of a cannon are heard, and finally we are being towed right up to the forbidden city!

We were not released until the next day, after having submitted to a minute search, a conscientious questioning, during which the police and naval men quarreled violently about us and about our gramophone, which one naïve individual persisted in mistaking for a dreadful wireless method of espionage. Especially mysterious was the fact that there was not a man aboard.

Photograph by Mariel Jean-Brunhes

THE CAPTAIN OF THE "BONITA" SHOOTS THE SUN

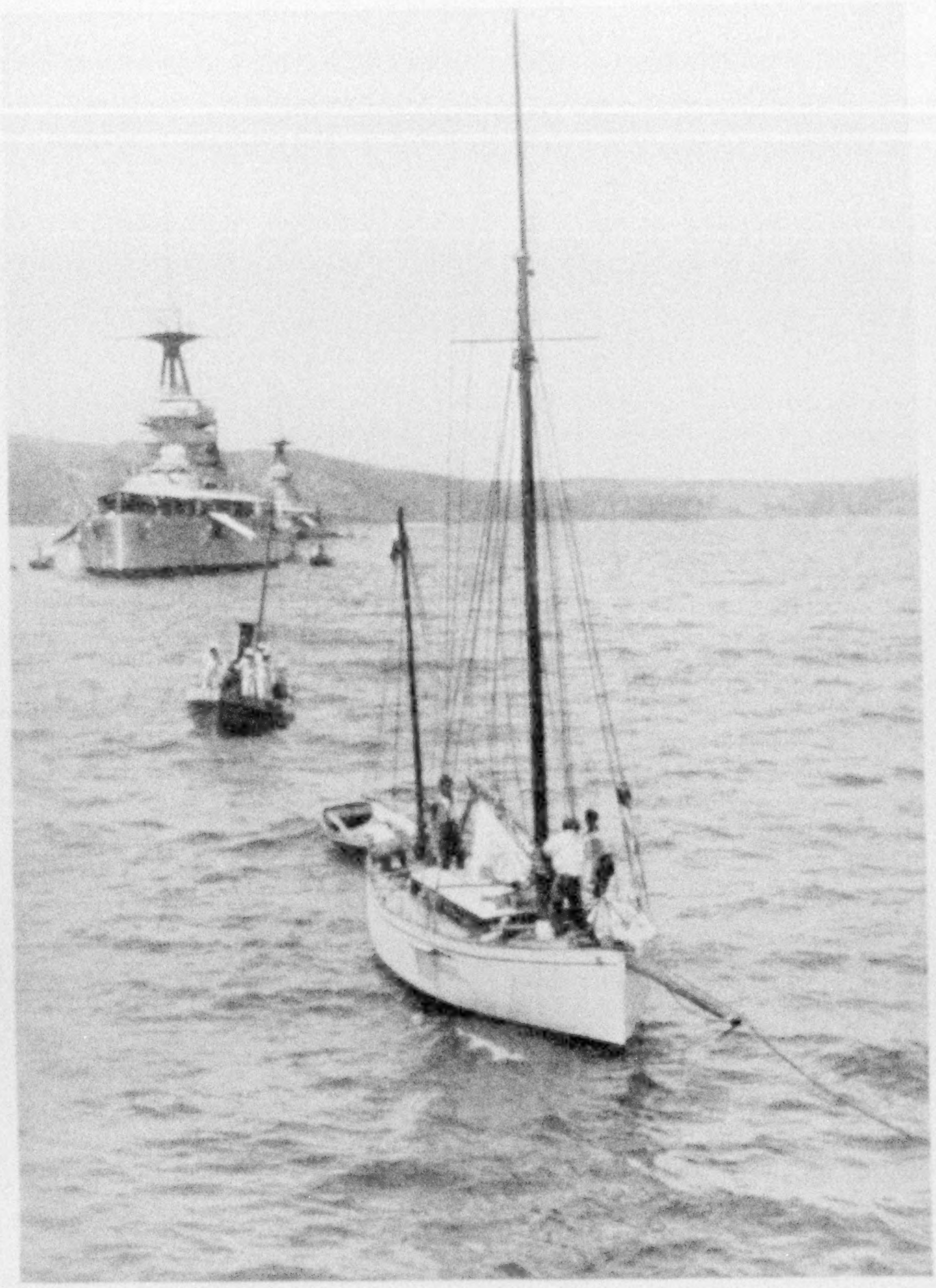
Mlle. Hermine de Saussure, standing near the mizzenmast, takes the ship's position. She is the daughter of a naval officer, has lived on the water much of her life, and has an excellent knowledge of navigation.

After this little incident, and in view of a threat of the sirocco, we decided to seek shelter in the Bay of Terranova, in northeastern Sardinia, where a British Mediterranean squadron was at anchor. We remained here for three days, while the sirocco lasted, and the little French yacht was given an unforgettable reception by those imposing warships (see illustration, page 252).

In sailor's garb we visited the ships, some of whose officers came and helped us repaint our boat. In our honor all the bands played the Marseillaise and the Lorraine March, and finally the squadron suggested a reunion a month hence, among the Ionian Islands, where it was scheduled to arrive at the same time that we planned to reach there.

The splendid ships of the British navy left for Malta at a 20-knot speed, while we slowly sailed along the coast to the Sardinian capital, Cagliari.

This city, crowned by its cathedral, rises upon an elevation between two salt marshes, with a vast background of mountains. In earlier days frightful massacres of tunny fish took place in these waters, of



Photograph by Rev. Beale

THE "BONITA" AT TERRANOVA, SARDINIA

The yawl on which the young authors made their Mediterranean cruise is being made fast to the stern of the British dreadnaught *Marlborough*. In the distance are the dreadnaughts *Benbow* and *Iron Duke* (see text, page 251).

which the island was as proud as Spain is of her bullfights.*

THE "BONITA" RIDES THROUGH A TEMPEST

It was on the 200-mile crossing, between Sardinia and Sicily, that the tempest—the inevitable tempest of all adventure—surprised us. We were struck by the libeccio, suddenly enveloped in mists and assailed by heavy seas, while avalanches of water poured into our cubby-hole.

Taking turns at the pump, we hardly dared hope that the *Bonita*, staunch though we knew her to be, could withstand the assault of the elements; but came morning and calm, and, thanks to the calculations of the captain, we reached Palermo, the Happy City—a Fascist Palermo, stirred by an approaching election and swarming with "black shirts."

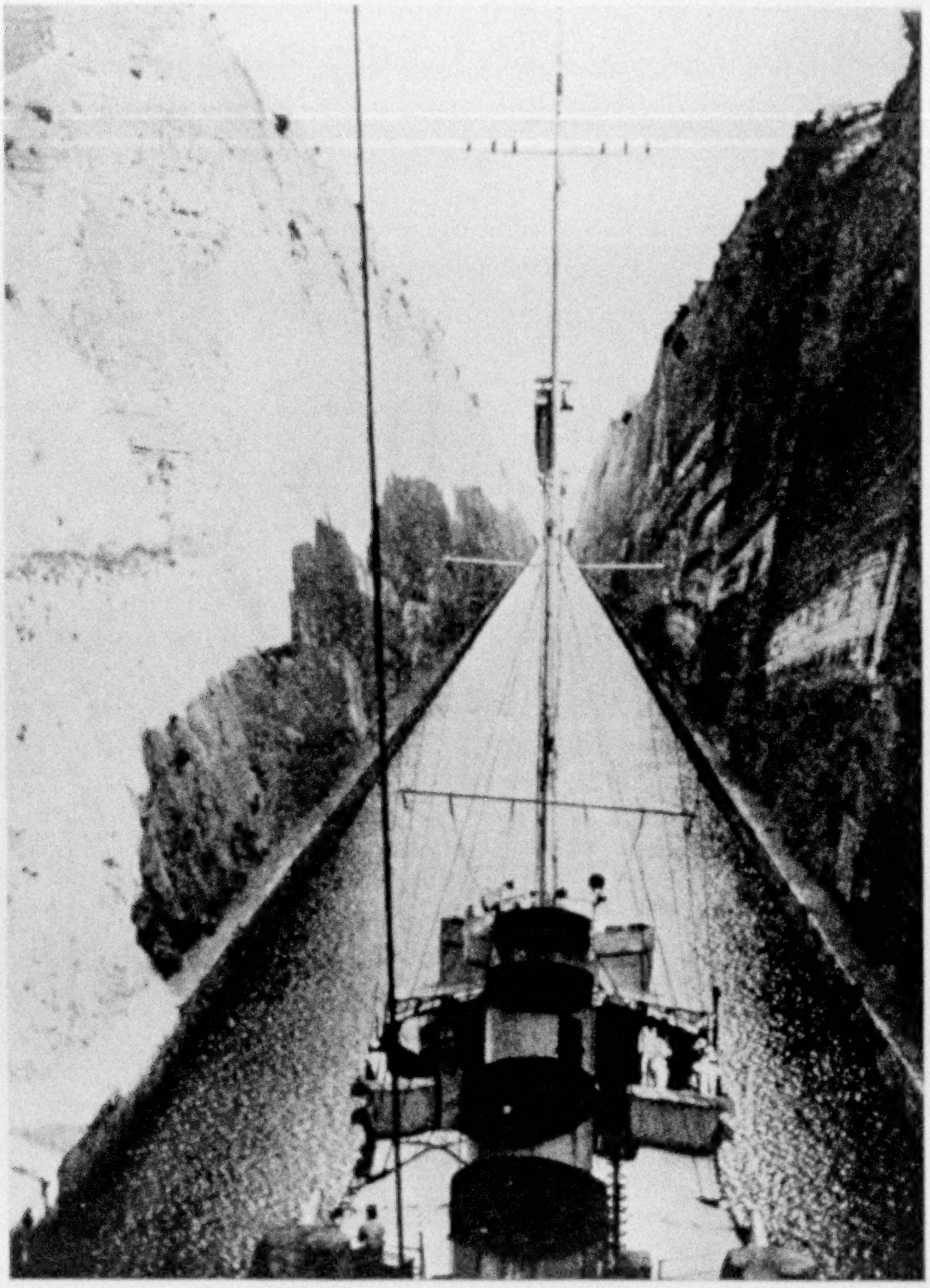
Then followed a rapid voyage west and southeast, skirting the island's shores. Our object was to visit some of the ancient temples. Segesta, rising at the foot of a cliff, amid large fields of rosy grain, seems quite intact when seen in the moonlight; Selinus, on the shore of the African Sea, is nothing but a chaos of cacti and gigantic ruins; Girgenti has a number of temples, but none so beautiful as many in Greece.

At Palermo, Yvonne de Saussure left us, and, as we were very much behind time, we were obliged to give up our plan to touch at Tunis; so the crew, reduced to three, steered the *Bonita* toward Messina, across that strait so dreaded by the ancients that they located Scylla and Charybdis there. At Messina the captain's young brother replaced Yvonne de Saussure.

ENTERTAINED ON A BRITISH FLAGSHIP

The date of our meeting with the British squadron drew near and the most difficult passage of the cruise remained to be accomplished—some 300 miles of open sea, in particularly dangerous waters, with the

* See, also, in the NATIONAL GEOGRAPHIC MAGAZINE, "Little-known Sardinia," by Helen Dunstan Wright, August, 1916, and "The Island of Sardinia and Its People," by Prof. Guido Costa, January, 1923.



THREADING THE CORINTH CANAL

Because they could not resort to sails, but had to rely upon oars and towline, this four-mile ribbon of water was the most difficult part of the entire voyage from Marseille to Athens. The vessel here shown in the canal is the U. S. destroyer *Barney*.

double threat of strong winds from the Adriatic and from Libia.

The *Bonita* made the trip in a heavy sea, and in the end without her mainsail, which was put out of service, but after three days of tribulations the island of Cephalonia appeared on the horizon. In its Bay of Argostoli we were to meet the English ships—no longer a squadron, but the entire Mediterranean fleet. This time the *Bonita* was received by Admiral Sir Roger Keyes, who, during the World War, was in command of the British blockading operations at Zeebrugge and Ostend. He came on board, on a tour of "inspection," and invited us to dine on his flagship.

Three days later the *Bonita* found herself alone among the Ionian Islands.

After visiting some of the villages on the Greek coast, we entered the Gulf of Corinth. We were now among places bearing the most famous names of antiquity. At Naupactus, also known as Lepanto, Mariel Jean-Brunhes was added to our crew in the capacity of cabin boy, photographer, and geographer.

THE HARDEST LEG OF THE CRUISE—THE CORINTH CANAL

The Corinth Canal was before us. Since the time when Nero, with his golden shovel, started the first work, this canal has caused its builders many tribulations, and now it was to prove the most arduous leg of our entire cruise. Small sailing vessels are not allowed to pass through without being towed; but, by waiting for a time when the canal was clear, we were authorized to pass through at night under our own motive power—two of us at the large oars, another at the helm, and the fourth tugging at the towline of the *Bonita* for the entire length of the narrow towpath.

Thus we progressed through the silent waters, between high and menacing walls, so narrow that two steamships cannot pass in the canal. The laborious four-mile passage was accomplished in three hours.

Two days later, after cruising about the islands of Salamis and Ægina, we came to anchor, like the big yachts, in the roadstead of Phaleron. But the *Bonita* was not a big yacht and she had been badly shaken

up on her long voyage. Three days later we abandoned her to go to Crete, where it is impossible to find a safe harbor for a small sailboat.

Many people were surprised that we should have taken pleasure in traveling for nine weeks, and at a cost of so much effort, a route which can be covered easily in five days by steamer!

But in navigating our boat we obtained a better understanding of the geographic value of such words as "port of call," "harbor," and "current." Also, from our similar experiences, we understood better the difficulties, needs, and pleasures—even the very spirit—of ancient voyagings.

If these places were not visited in a small sailing vessel, one would rarely reach the hidden spots or understand their life. An island must not be approached too abruptly, and nothing prepares one for it better than a slow arrival from the sea.

This cruise was truly a prelude to our trip to Crete, and it furnished us with many points of comparison with the other islands of the Mediterranean.

OUR ARRIVAL IN CRETE

About 15 hours from Piræus, after having skirted the islands of Melos and Antimelos of the Cyclades group, the long mountainous profile of Crete became visible.

Mythology explains that one of the Cyclades, Delos, was a floating, vagrant island until Zeus, the sovereign master of Olympus, anchored it to permit Leto, persecuted by the jealous Hera, to find a refuge. Here it was that Leto gave birth to Apollo and Artemis, son and daughter of Zeus himself. Legend also relates that Hera, furious at the frequent escapades of Zeus in Crete, came from Olympus to surprise her husband and was suddenly transformed by him into a block of stone (the island of Dia, or Standia), forever isolated from the northern coast of Crete. A short time later the remorseful god placed a little cake in front of the petrified form of the goddess; this is the reef at one end of Dia. (This island is not to be confused with Naxos, in the Cyclades, which also bore the same name in ancient times.)

Geologists have told us their own story of these Ægean islands, a story much more dramatic than all the mythological tales. They tell us that formerly Greece and Asia Minor formed a single mass of land. Following some mighty cataclysms, the crust of this portion of the earth's surface was submerged, only to be raised later to a high altitude. Then it fell once more. There remain the mountainous Greek peninsula, western Asia Minor, and the countless islands which rise from uneven depths. Among them, in the south, is the lengthy island of Crete.

Crete has an area of about 3,300 square miles, being 160 miles long and varying in width from 35 to 7½ miles. But what matter 160 miles in length? They could be traversed in a few hours at most by railroad—if there were railroads. It takes days and days to cover Crete by land from one end to the other.

The more accessible sections of Crete are now covered with a network of fairly important highways, but in remote districts the traveler must use the traditional means of transportation—donkey or mule, over trails or uneven paths. And if it is necessary to adapt oneself to the fatigue and the needs of one's animals, it is also essential to take into account the aversion which every Cretan feels at the prospect of traveling at night!

FROM THE MOUNTAIN TO THE PLAIN

We traveled over Crete in every direction and at all altitudes. The whole island is dominated by the mountains which intersect it. They include the Lasithi range in the east, with Mount Dicte; the Psiloriti, with Mount Ida near the center of the island, and to the west the White Mountains, locally, and rightly, named the "Desert of Stone." These peaks rise to more than 7,000 feet and are covered with snow in winter, but in summer and early autumn large herds of sheep graze on the slopes.

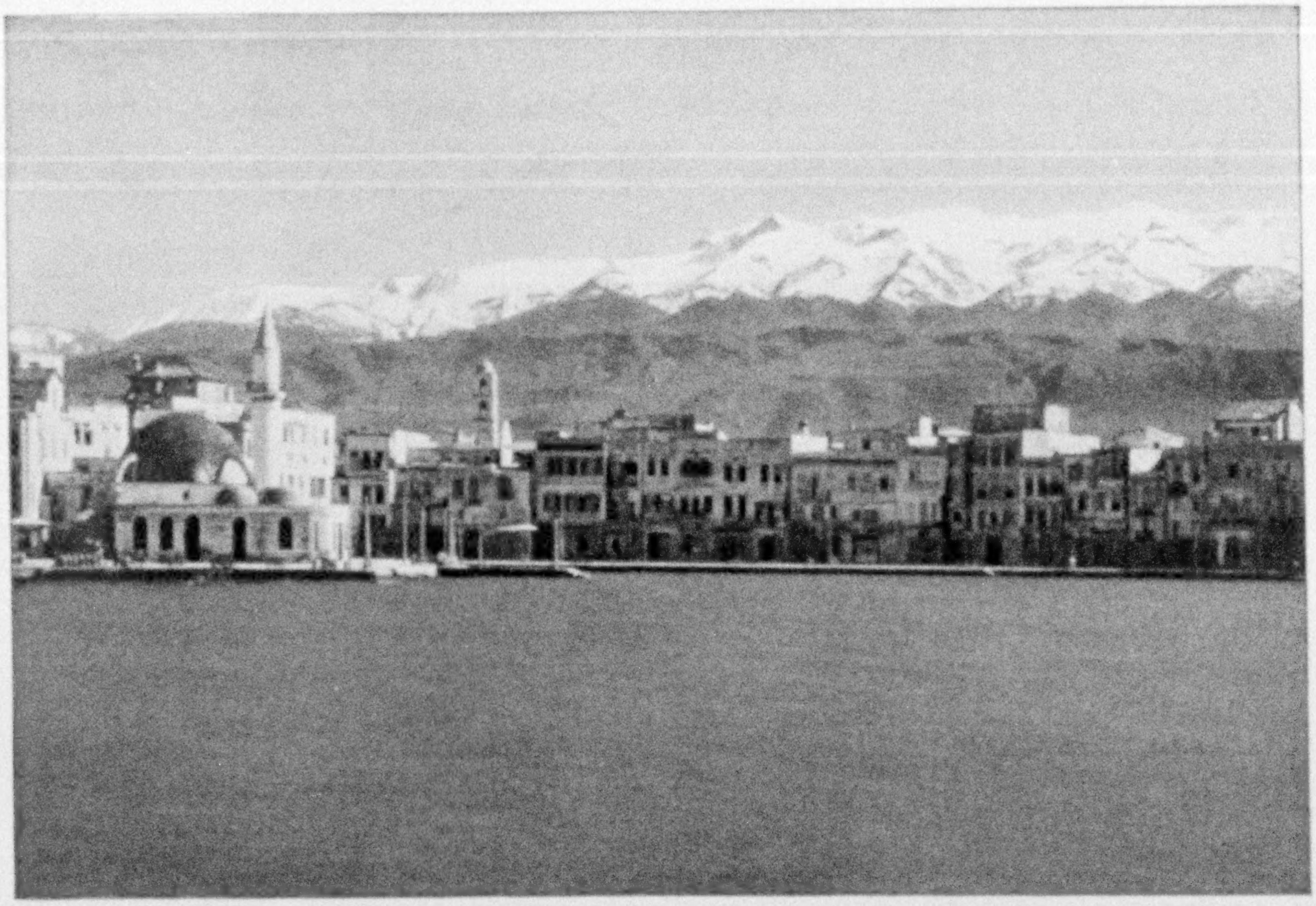
After leaving these herds, and the round stone huts where the solitary shepherds live, we wandered over many trails without meeting a living soul.

While continuing our downward path, suddenly a great plain would come into view—like that of Lasithi, formerly occupied by a lake. Again, we would go along a winding, rocky path on which even the mules stumbled, for the hoofs of predecessors have left their marks and the trail has become slippery and dangerous.

© National Geographic Society Autochrome by Maynard Owen Williams

THE MULETEER IS A PERSON OF IMPORTANCE IN CRETE

The mountainous contours of the island, and the political unrest that so long beset it, combined to hinder development of transportation facilities. There is but one three-mile stretch of railroad, and highways, although improving, are still comparatively few and for the most part poor. As a result, mules and donkeys have a corner on the carrying trade.



CANEA'S WHITE MINARETS ARE SLIM SPECTERS OF DEPARTED DAYS

A long period of occupation by the Moslems imparted to the Cretan capital a distinctly oriental aspect. The limestone crests of the White Mountains rise behind the city.

© National Geographic Society Autochromes by Maynard Owen Williams

THE LION OF SAINT MARK LEFT A LASTING IMPRESS HERE

The Venetians came into possession of Crete in 1204 and held it for more than four centuries. They proved harsh masters, taxing the people heavily, but during their régime the island was well fortified and comparatively secure from attack. Some of the old walls and harbor moles are still standing at Candia.

LARGE VESSELS CANNOT ENTER THIS TOY HARBOR

Candia's port was built to accommodate the vessels of medieval days, and now most ships have to anchor in the open sea and send their passengers and cargo ashore in small boats.

© National Geographic Society Autochromes by Maynard Owen Williams

MOST CRETAN GIRLS HAVE PUT ASIDE THE CHARMING COSTUMES OF THE PAST

So thoroughly modernized has feminine attire become that even among the mountain villagers one must seek far to find any trace of the beautiful old costumes that once lent their wearers such distinction (see Color Plates V, VI and VII). However, the women are still capable of producing fine specimens of needlework.

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Autochromes by Maynard Owen Williams

THEIR FORBEARS RULED AN IMPORTANT PART OF THE ANCIENT WORLD

Long before the fall of Troy, Crete was inhabited by a highly cultured race whose achievements were generally regarded as in the realm of the mythological until excavations early in the present century brought to light actual proof of their existence The young lady at the left wears a kimono, the decorations on which are identical with designs found in the age-old Palace of Minos at Knossos, near modern Candia. The man at the right smoking a waterpipe wears the national costume. Ancient Crete was probably the first great sea power (see "The Sea Kings of Crete," by James Baikie, in the National Geographic Magazine for January, 1912).

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CRETE IS FAMOUS FOR ITS CITRUS FRUIT

Olives, grapes and currants of high quality are raised extensively. Oil, raisins, wine, soap and pottery comprise the principal export products. The excellent oranges are nearly all consumed at home.

Autochromes by Maynard Owen Williams

A PASSING PHASE OF FASHION

Costumes like the one worn by this maid of the Hotel Idaion Antron in Candia have waged a losing fight for existence and are fast disappearing before the advance of Parisian modes.

© National Geographic Society

A DWELLER NEAR THE BIRTHPLACE OF IMMORTAL ZEUS

Anogia, the village home of this mountain maid, is on the slopes of Mount Ida, not far from a grotto where legend tells us the King of the Gods was born and nursed by nymphs.

Autochromes by Maynard Owen Williams

HE LIVED AND RULED BEFORE THE DAWN OF HISTORY

So long ago that only conjecture can date the period, kings of the Minoan Dynasty ruled in Crete. This lifelike fresco of one of these priest kings was found at Knossos, the ancient capital.

© National Geographic Society

Autochromes by Maynard Owen Williams

DIGNITY AND INDEPENDENCE DISTINGUISH THE CRETAN CHARACTER

Born and bred into the very fiber of the people of this rugged isle is a love of liberty that a thousand years of oppression failed to quench. Saracen, Byzantine, Venetian and Turk have tried in turn to crush the men of Crete, but each time the sturdy natives have retired to the inaccessible fastnesses of their hills. While women seldom wear the old national dress, men, especially in the country, are proud of their picturesque costumes. The brightly garbed gentleman at the right took an active part in excavating the Minoan ruins of Knossos.

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HOUSEWIVES OF THE ANCIENT ISLE ARE PARAGONS OF INDUSTRY

Factories are not numerous and many articles for personal and household use are made by the members of the family. All the processes necessary to convert wool on a sheep's back to the coat on a man's, including spinning, weaving, dyeing and tailoring, are performed by the women in their own homes.

On a broad, elevated pass we sometimes saw a straight line of windmills, occasionally as many as twenty or more, each placed in a specially advantageous position to catch all the wind which the large wings require. The peasants from the villages climb up to them with their donkeys laden with grain (see pages 267, 268). On the other hand, along the steep mountain slopes water mills are built in the ravines. The mills run only in winter, for during summer there is no rain; hence no water.

GROTTOES WERE ONCE PLACES OF WORSHIP

While Crete has an extremely heavy rainfall, it is limited to the wet season, which commences in October or November. The water accumulates and rushes down the mountains in violent torrents; it penetrates the soil and circulates through a vast network of limestone grottoes. It was in these grottoes, now a fairyland of stalactites and stalagmites, that the first inhabitants of the island established the worship of their gods. To-day one finds among the rocks the altars and paraphernalia of ancient rites.

Some of these grottoes are veritable pits, into which one descends with the aid of ropes. One readily appreciates the impression they must have produced on the imagination of the men of other days, when one notes the respectful awe they still command. The natives in their folklore still people these caves with monstrous men and animals.

Villages dot the borders of the Cretan plains, and the inhabitants come to their doors and smilingly invite the passer-by to enter.

Occasionally we met a peasant on his way to the village, carrying on his head a basket overflowing with grapes. He would stop, select the most beautiful cluster, and offer them to us with touching simplicity. When they were accepted he showed his delight by a burst of laughter.

As the traveler passes over a "Pont du Diable" (Devil's Bridge), which straddles the deep bed of a torrent, the valley widens, and the olive trees seem to come toward him, as if to welcome him to more civilized surroundings.

In regions which are less protected from the elements, the locust tree grows, but it is bent and gnarled by its battle with the violent north wind. There are vineyards on the hillsides and vegetables grow in the river beds, which are dry in summer, or on the thin layers of fertile soil which cover the stone of some of the seashore plains. Irrigation is practiced intelligently; large windmills raise the water, or norias grind away as the water is raised pail by pail from wells.

CITIES AND VILLAGES OF CRETE SHUNNED THE SEA

Formerly, all habitation ended and all cultivation ceased at a certain distance from the sea, and most villages to-day are located in a zone somewhat away from the coast; for, though the sea is the purveyor of provisions and the best road for travel, it was also the haunt of pirates of old. Thucydides wrote: "The old cities are preferably established away from the sea because of the pirates, who carried away everything along the coast."

There are many more farmers than fishermen among the inhabitants of the coastal zones of Crete, and this applies to most of the Mediterranean islands. The villages have, however, established a few storehouses along the coast, and these provide a sort of step to the interior.

While the menace of piracy long since disappeared, up to fifty years ago the Turks, as a measure to prevent smuggling, frowned upon coastal settlements. The first house at Haghios Nicolaos was built in 1870; to-day the town has 1,200 inhabitants and is an export port.

If the traveler does not reach the sea by way of the rocky zones or the brushwood deserts, he may find at the extremity of certain headlands which protrude massively seaward, or at the base of some great gulf, dwellings which have a dramatic history. They were established on the seashore, but, as if to point out the dangers in being so situated, they were surrounded by strong fortifications and at the ends of breakwaters were fortified castles.

Canea, surrounded by Venetian ramparts, is the capital of Crete; it is situated in the western part of the island (see Color Plate II, upper).

Candia, farther to the east and also on the northern shore, is the only other city of commercial importance. During the Venetian occupation of the island this stronghold was known as Megalo Castro

Photograph from Mariel Jean-Brunhes

THE AUTHORS ON BOARD THE "PERLETTE" IN PHALERON HARBOR

On this craft the *Bonita's* captain, Mlle. Hermine de Saussure, and Mlle. Oulié (right), cruised among the Ægean Islands prior to the voyage of the *Bonita*. Mlle. Mariel Jean-Brunhes (left), a gifted young geographer and daughter of the Professor of Human Geography in the College de France, went to Crete with Mlle. Oulié, a Sorbonne graduate, who was commissioned by the French School at Athens to continue her archeological researches in Crete. In the right background is the stern of the *Bonita*, which, no longer seaworthy after her voyage from Marseille to Phaleron, was left in Greece while the party proceeded to Crete by steamer (see page 253).

(Great Fortress); but many centuries before the Venetians held sway in Crete and before the Saracens left their impress, the inhabitants of the island had established a trading station at this point, to judge from the fragments of cut stone discovered in the sea near the shore.

To-day, Candia is nearing the 40,000 population mark. Its white suburbs extend far beyond the old fortifications. A few years ago an English engineer was commissioned to reorganize the port. The work is being pursued with due regard to the historic value of the old fortifications (see Color Plates II and III).

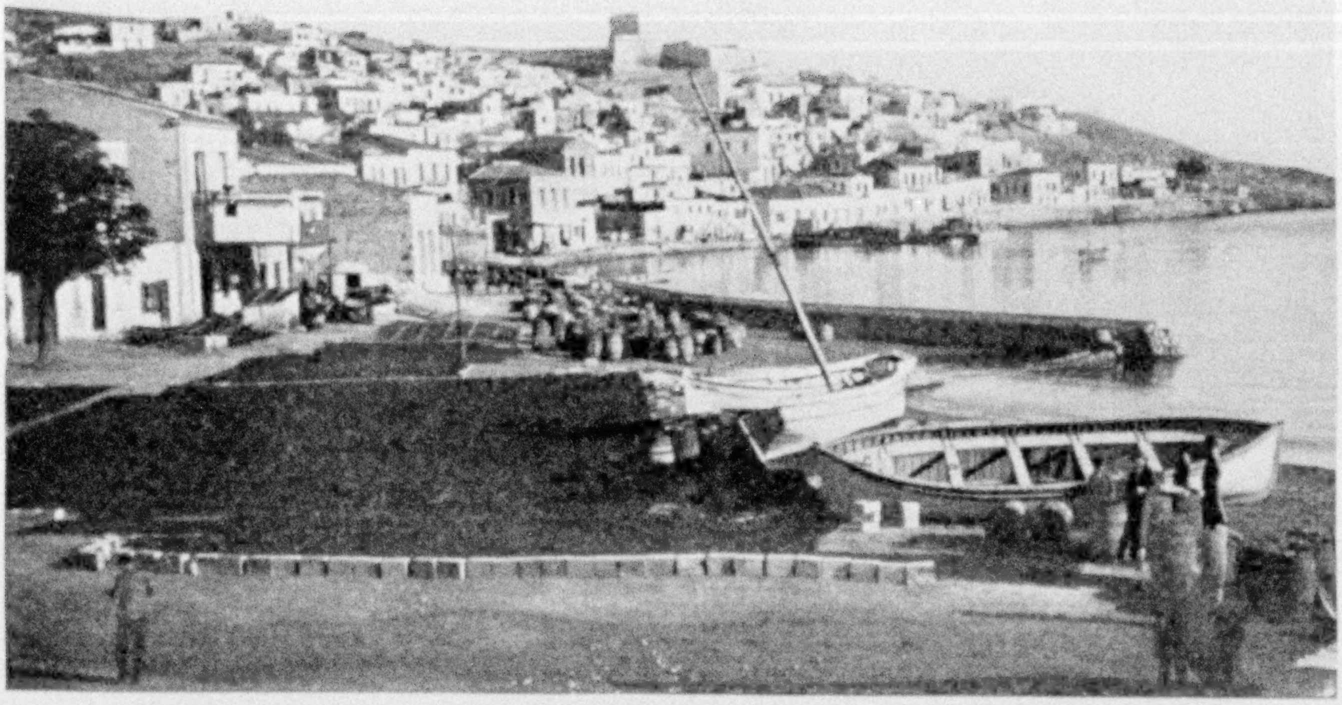
PRIMITIVE SHIPPING ON THE SOUTHERN SHORE

The southern coast of Crete has few safe anchorages and most of the trade is handled by sailing craft and motor boats. Large ships cannot approach the wharfs of the small harbors, but are obliged to remain some distance offshore. By means of a crane, merchandise is unloaded into a caïque, which then approaches the beach as closely as possible. There naked men, standing in water up to their shoulders and with pads on their heads, seize the various objects and carry them ashore.

As soon as the ground swell rises, work must stop. What a primitive sight!

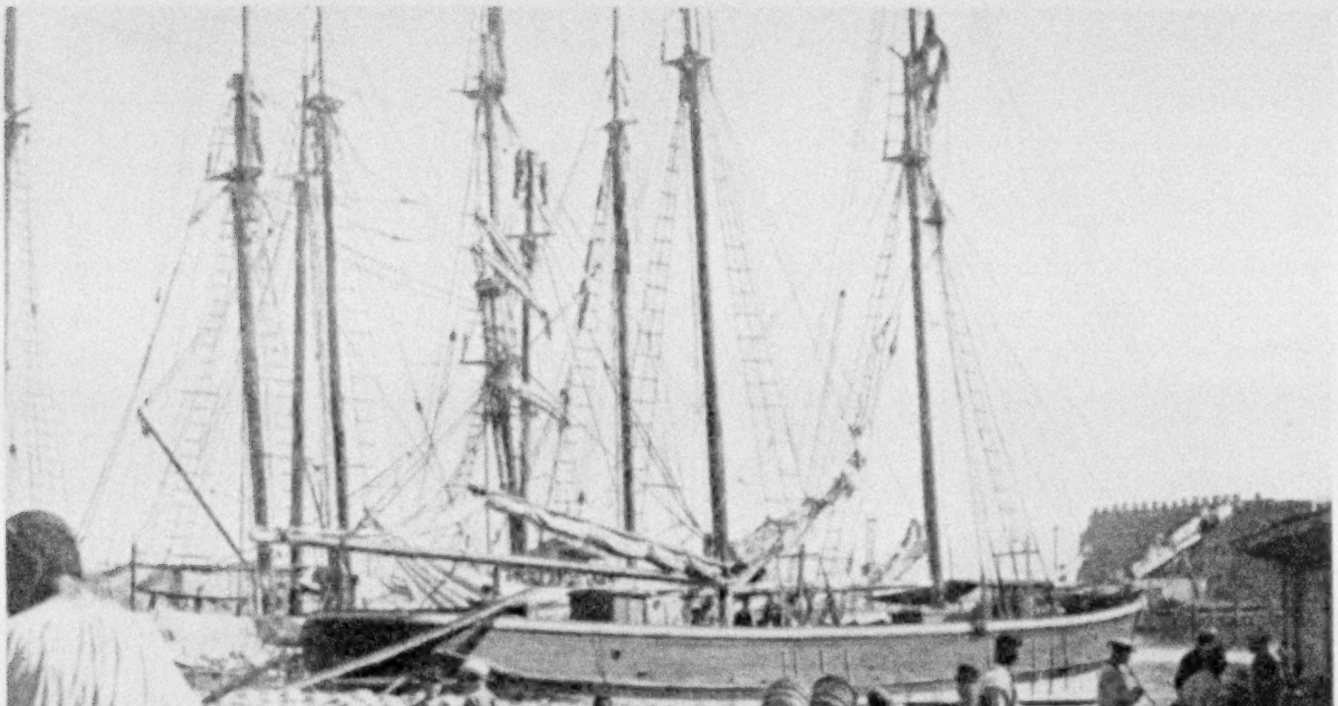
Often at night, if the sea is rough, a ship will approach the shore, blow its whistle, and with the aid of a megaphone a conversation will follow between vessel and port official. If the load offered is unimportant, the ship pursues its course without stopping.

These villages by the sea are very isolated; in daylight they are hardly visible and at night not at all, as no light marks them. They are as if "thrown into the sea" by the mountain, which bars their access to the interior. They are at the mercy of the heavy southern storms, which all



GOLDEN CARPETS OF RAISINS ALONG THE QUAYS OF SITIA

After being treated with sulphur, the raisins are exposed again to the sun for a single day. Special guards keep a watchful eye on the drying fruit to prevent greedy or unscrupulous persons from taking liberties with it (see, also, text, page 270).



Photographs by Mariel Jean-Brunhes

FRESH GRAPES ON THE WHARVES AT CANDIA

While the harbor of one of the two chief commercial cities of Crete is being modernized, it still retains its picturesque aspects. The grapes of the island are exported in attractive baskets. Petty dealers in *loukoumi* (Turkish delight) and peasants on donkey back increase the difficulties of getting about. To the right is a section of the medieval castle which formerly guarded the entrance to the harbor (see, also, Color Plates II and III, and text, page 270).

Photograph by Maynard Owen Williams

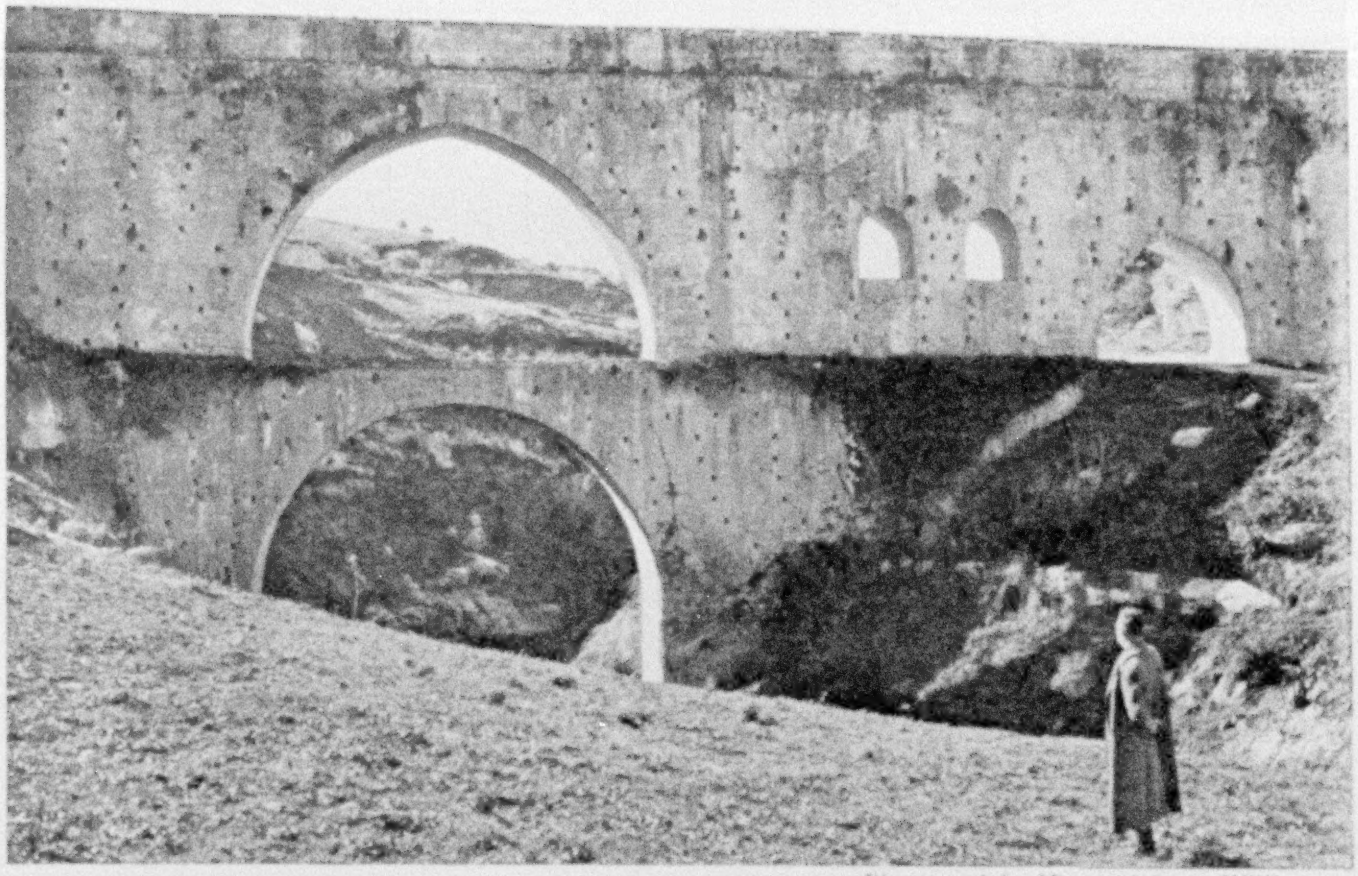
GOATHERDS PURSUE THEIR LEISURELY WAY ALONG THE ROAD FROM CHERSONESOS TO CANDIA

Goats thrive in rugged Crete and their milk is a food item of importance. The pillar of earth in the foreground was left by highway engineers possibly to enable them to estimate the amount of soil they had removed in grading for the new road, but it also serves as a monument to the geological forces that shaped the land before they did.

Photograph by Maynard Owen Williams

CRETAN WINDMILLS OPERATE ONLY WHEN THE WIND BLOWS FROM ONE POINT OF THE COMPASS

But the strong breezes of the island do blow chiefly in one direction most of the time, and hence this row of windmills combs the gusts as they sweep down the valley (see, also, illustration, page 268, and text, page 263).



Photograph by Maynard Owen Williams

AN AQUEDUCT NEAR PREHISTORIC KNOSSOS: A TILE PIPE STILL CARRIES WATER ACROSS THE RIVER

Photograph by Mariel Jean-Brunhes

TWENTY-ONE CRETAN MILLS PERCHED IN A MOUNTAIN PASS

In a treeless, stony waste, these mills face the violent winds from the north. When tiny donkeys have brought upon their backs big bags of grain for grinding, the mills unfold their white wings over wooden frameworks (see, also, illustration, page 267, and text, page 263).

Photograph by Maynard Owen Williams

THESE LIFE-PRESERVER LOAVES OF CANDIA ARE WHITE, FIRM, AND WELL BAKED

Whether seasoning the bread with the dust of the highway improves it is a question; but these are the signs by which one can recognize a baker in Crete.

but deprive them of any outside communication.

THE AUTOMOBILE MAKES ITS WAY IN CRETE

An account of Crete would not be complete if we did not describe our means of locomotion. There is but one railroad in Crete and it is three miles long. It was built in recent years for the transportation of stone from a near-by quarry to the harbor of Candia. The locomotives, christened Minos, Ariadne, and Theseus, in honor of mythological characters that have played prominent rôles in the legendary history of the island, are justly admired by the entire population.

On the other hand, Crete boasts many automobiles, so that it is passing abruptly from primitive means of travel—by donkey or muleback—to extremely advanced means—the automobile (see page 248).

Road construction has promoted the use of the automobile, but even where there are no roads a motor car is frequently seen. What with the mire of the mule paths, the stones, the brush, and the fields, one traveling by automobile never knows when or if he will reach his destination, although his car carries the inscription in large letters: "Express."

To supplement our impressions of the island gained by our crisscross land travels, we took a small coasting vessel which, at irregular intervals, circles about Crete, first in one direction and the next time in the other. We embarked at Canea, stowing all of our camp equipment on the deck, where we remained night and day, watching the panorama of the coast and going ashore at each landing place. Thus we acquired a mental motion picture of the economic life of the island.

Through the ages, Crete has always enjoyed a certain renown. Aristotle extolled it as an island which "seems made by Nature to have empire over Greece, in that it is so advantageously situated as to dominate the sea around which all the Greeks are settled." "From all corners of the earth," says the Florentine traveler Buondelmonti, who visited Crete in the 15th century, "come the ships to load with the island's excellent wine and wheat." But

Photograph by Maynard Owen Williams

AN ESSENTIAL INGREDIENT OF FRUIT CAKE BEING PREPARED TO LEAVE ITS ISLAND HOME

Citrons, which have been soaking in sea water for several weeks, are here being sorted by size and condition before being shipped from Candia to America and Italy (see text, page 271).

if wheat was formerly exported to-day it is an article of import, grain coming from America and Rumania to supplement the insufficient crop at home.

RAISINS, OLIVE OIL, AND CITRONS SUPPORT CRETE

He who leaves Candia in the autumn for a trip across the island sees spread before him large expanses of yellow and silvery green, with a few lines of austere black; these are the vineyards mixed in with the olive trees, while a few cypresses stand solitary or in a line.

This vista continues even after he begins to climb in order to reach the desert interior of Crete, for the vineyards and their attendant olive trees grow to a great elevation. Though they space out the farther one gets from the plain, nevertheless they remain equally luxuriant. They creep into small hollows or cluster on the very steep slopes—sometimes they give the impression that they are going to slide off into space—while pretty vine arbors shade the streets of mountain villages.

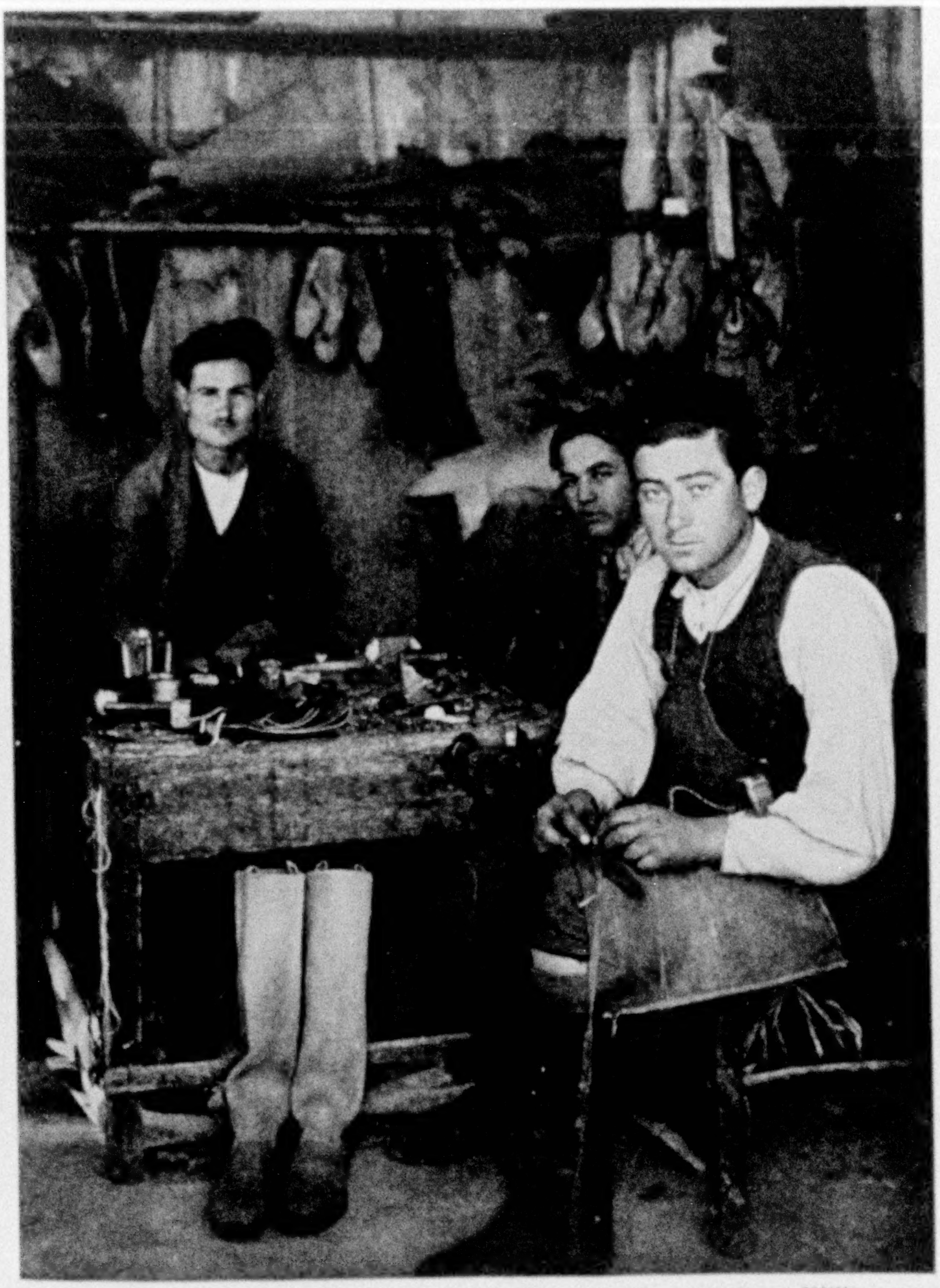
Raisins play an important part in the economic life of Crete. In the large cities and at the ports one may see in the rather dark factories the different processes the raisins undergo. On arriving in Sitia, in eastern Crete, we found spread upon the wharves immense golden areas of fruit drying in the sun before being packed in cases for shipment abroad under the celebrated name of Sultana raisins (see page 265). Fresh grapes are exported to Greece and to Egypt. Alexandria is only 36 hours from Candia, and small steamers loaded with baskets of grapes are coming and going constantly in September and October (see p. 265).

Crete takes an important place among olive-oil-producing countries. The oil is extracted in primitive presses by the peasants and on a larger scale in factories. Much of the table oil is consumed in America.

An outgrowth of this industry is the production of *grignon* oil, which is becoming of more and more importance in the occupations of the island. This oil is ob-

tained by repressing the olive pulp remaining from the first operation, which yielded the table oil. From 4 pounds of olives one obtains about 1 pound of olive oil and 2 of pulp, which yields 10 per cent of its weight as grignon oil.

One of the more interesting products of Crete is the citron crop. In the vicinity of many harbors one may see large open casks filled with sea water in which float the rounded halves of citrons, which are left in the brine for one or two months, exposed to the open air, before being shipped to England or to the United States, where they are dried and prepared for sale (see illustration, page 270). Traveling on boats transporting this fruit is a pleasant experience, for the contents of the barrels perfume the air.



Photograph by Maynard Owen Williams

A CRETAN BOOTMAKER OF HAGHIOS NICOLAOS

Such pure-white Cretan boots are becoming scarce. It is customary to leave a narrow strip of bare skin between the top of the boot and the bottom of the trousers (see Color Plate IV). In the brushwood country, boots prove their value, but they are generally worn, even on the moderately decent roads (see, also, text, page 263).

One of the most famous products of the island is the *dictam*, or dittany, a plant growing on Mount Dicte. In the Middle Ages almost miraculous curative powers were ascribed to it. And Dapper, the Flemish traveler, who visited Crete at the beginning of the 18th century to hunt wild goats, wrote: "If by chance the goats have been only slightly wounded, or if the head of the arrow remains in the wound, they first resort to a certain plant which grows on the rocks of this island, and which is called the dictam, for if they can eat of this plant, the iron comes out and soon falls out of the wound, and they are healed in a very short time." Dittany was supposed to be equally efficacious for wounded human beings.

The tobacco plantations of Crete have made great strides in recent years, as a direct result of one of the most significant events of the eastern Mediterranean—the exchange of nationals between Greece and Turkey following the Treaty of Lausanne.* Repatriation brought to the island many experienced tobacco growers from Asia Minor.

* See "History's Greatest Trek: Tragedy Stalks Through the Near East as Greece and Turkey Exchange Two Millions of Their People," by Melville Chater, in the NATIONAL GEOGRAPHIC MAGAZINE for November, 1925.

Photograph by Maynard Owen Williams

COMEDY RELIEF IN CANDIA

These six live beside the inner harbor and their house backs up to the Venetian warehouses, which existed when the harbor was larger and galleys found refuge in what is now a roadway within the customs area. The youngest one sees no reason for unseemly mirth.

Hospitality in Greek countries is traditional, and Crete is no exception. Whenever we arrived in a village young girls in white fichus came to take us by the hand and escort us to their homes. Outside the houses we often saw picturesquely clad tailors at work.

Let us enter one of these houses.

Through a door cut into a high wall of stone, we enter a small courtyard, where we find a sheep whose wool is later to be woven by the women of the household. A second and lower door opens into a large room with an arch separating it into two. This is the *kamaros-piti,* where the family eats, sleeps, and works.

In a corner is a hearth where, upon a few large stones, a fire of boughs is burning. A bed, usually covered with embroidery, and weaving paraphernalia may be observed.

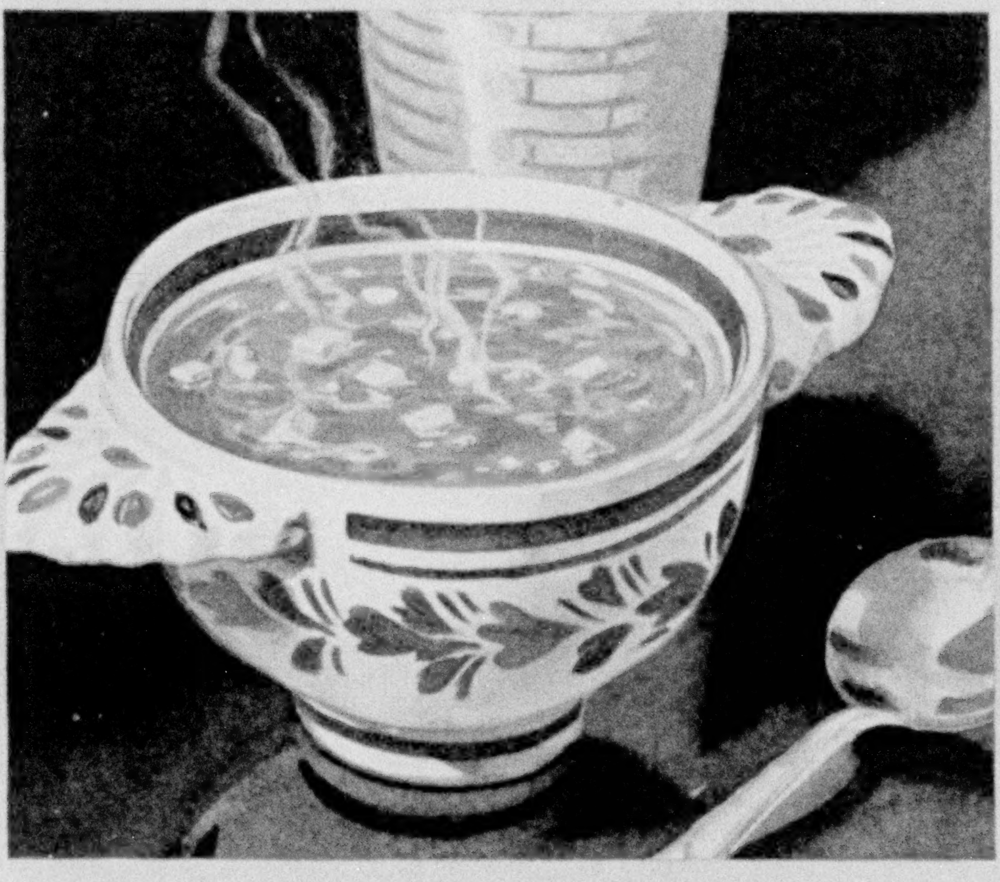
All around the room are photographs of young couples, with the man always seated and the woman standing. One thing is never lacking—the romantic photograph of the brother or relative, with shaven face, sent from America by some Cretan who has gone to the New World to make his fortune and who usually returns to finish his days in Crete. Thanks to this practice, English is spoken in many of the most out-of-the-way villages of Crete.

During the pleasant months of the year the family sleeps on the flat roof of the house. Here, too, the cotton crop and the nuts and almonds are dried.

THE LARGER STORY—CRETE OF THE PAST

That which we have described is the Crete of the present. The larger story, the Crete of the past, presents too many ramifications to be set forth at this time. English, American, Italian, French, and Greek archeologists are engaged in unearthing the pages of the island's history during the three thousand and more years of its unique civilization before the Christian Era. It is an absorbing narrative, which the savants of the world are slowly revealing by means of spade and trowel.

VEGETABLE SOUP
ideal for the children

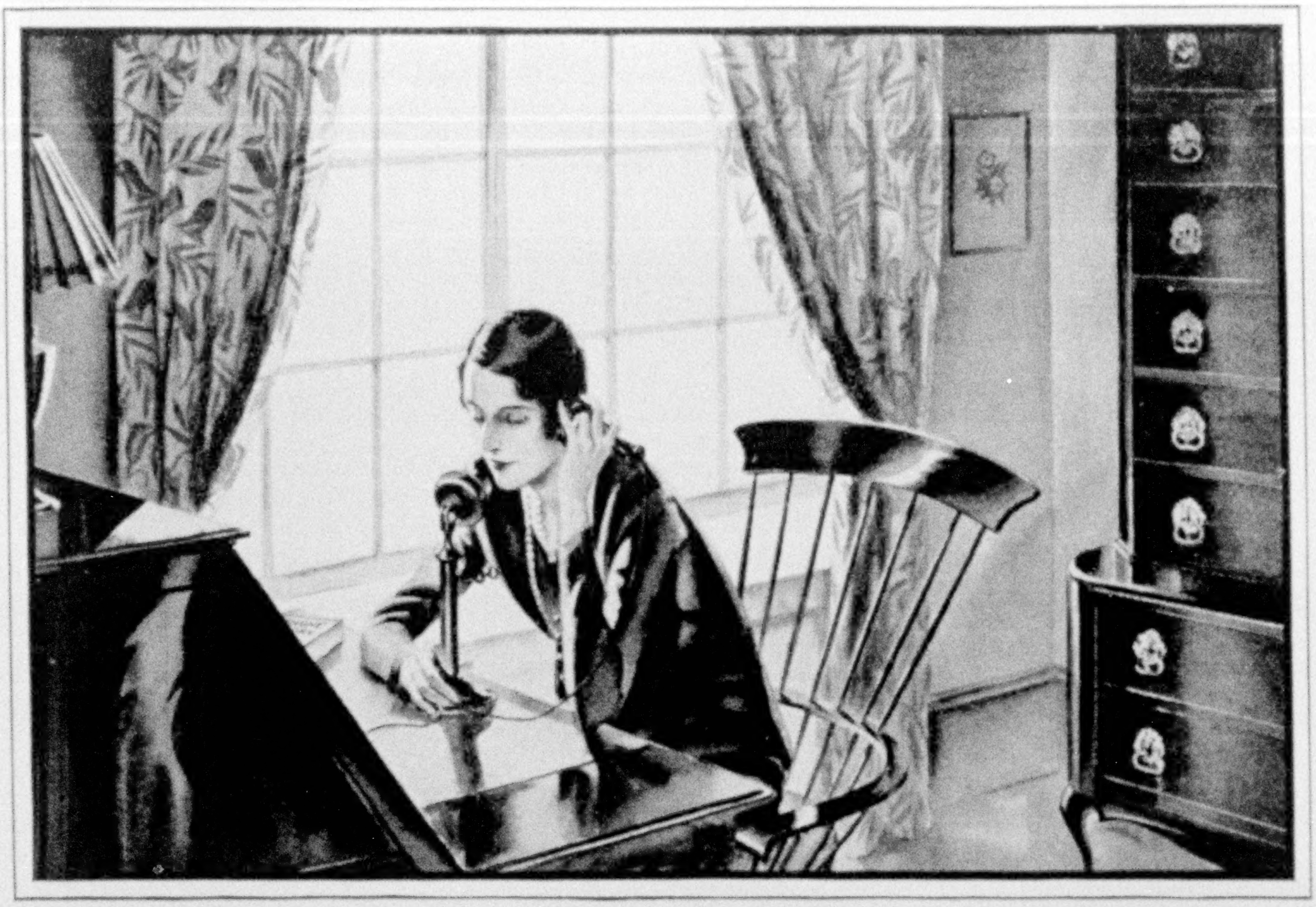


You want your children to eat more vegetables. All mothers do, for they know the health value of vegetables. Place a bowl of Campbell's Vegetable Soup in front of each child today and see how quickly that soup disappears!

Children love this soup and in it they get the benefit of fifteen different vegetables — all the choice things of the garden. Here is real health for them! 12 cents a can.

LOOK FOR THE RED-AND-WHITE LABEL

WITH THE MEAL OR AS A MEAL SOUP BELONGS IN THE DAILY DIET



There is no standing still . . .

An Advertisement of the American Telephone and Telegraph Company

During the past two years 6000 switchboards have been reconstructed in the larger cities served by the Bell System to enable the operators to give a more direct and faster service.

Previously in towns where there were more than one central office, your operator would hold you on the line while she got the operator at the other central office on an auxiliary pair of wires. Now she connects directly with the other central office and repeats the number you want to the other operator. You hear her do this so that you can correct her if there is any mistake.

This little change cost millions of dollars. Likewise, it saves millions of minutes a day for the public and it has cut down the number of errors by a third.

It is one of the many improvements in methods and appliances which are constantly being introduced to give direct, high-speed telephone service.

There is no standing still in the Bell System. Better and better telephone service at the lowest cost is the goal. Present improvements constantly going into effect are but the foundation for the greater service of the future.

"The Telephone Books are the Directory of the Nation"

Busy—*He takes a short-cut to sound investments*
—so can you

In these "high pressure" days you must make every working minute count. Instead of shopping leisurely as you did a decade ago, you now save time by settling on one reliable house in each line—be it clothing, jewelry, furniture, or investments. The National City Company makes it easy for you to handle your investments on this time-and-worry-saving principle. It maintains offices in over fifty leading American cities for the convenience of busy men. Just telephone our office nearest you when you have funds to invest or wish market quotations or other investment information. Our experienced men will gladly help you.

The National City Company

National City Bank Building, New York

OFFICES IN 50 AMERICAN CITIES. INTERCONNECTED BY 11,000 MILES OF PRIVATE WIRES. INTERNATIONAL BRANCHES AND CONNECTIONS.

Knocks out that "knock"

Take me with you and get a kick out of driving instead of a "knock"

Ethyl

The reason is HIGH COMPRESSION

GASOLINE explodes too soon—"knocks" and loses power — when it is pressed beyond certain limits. And as everyone knows, it is the degree of squeezing of gasoline and air into the combustion chamber before ignition that determines the force of the explosion and the consequent power produced.

Ethyl Gasoline controls the combustion rate as compression is raised and thus makes it possible to build engines of higher compression and greater efficiency.

A "high compression" car obviously requires high compression fuel to show its best. And now national distribution of Ethyl Gasoline has made possible the new models of higher compression and superior performance.

But Ethyl Gasoline has meant even more: the millions of owners of cars of average compression can enjoy high compression performance by using Ethyl. For carbon raises compression by decreasing the size of the combustion chamber.

Fill your tank with Ethyl today. You'll find a real difference in driving satisfaction.

ETHYL GASOLINE CORPORATION

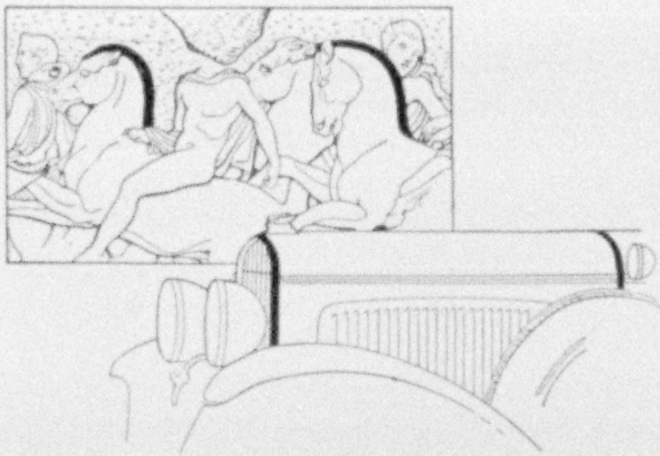
25 Broadway, New York City · 56 Church St., Toronto, Can.
36, Queen Anne's Gate, London, Eng.

ETHYL GASOLINE

© E.G.C. 1929

CHRYSLER

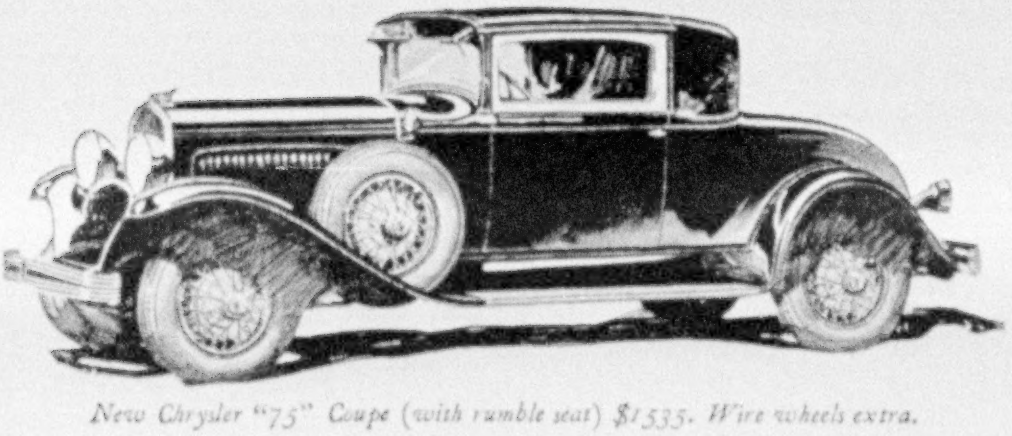
BEAUTY *is no chance creation*



The most modern thing in motor car design—Chrysler's matching of slender-profile radiator with cowl bar moulding—has its artistic origin in the repetition of motif in the historic frieze of the ancient Parthenon.

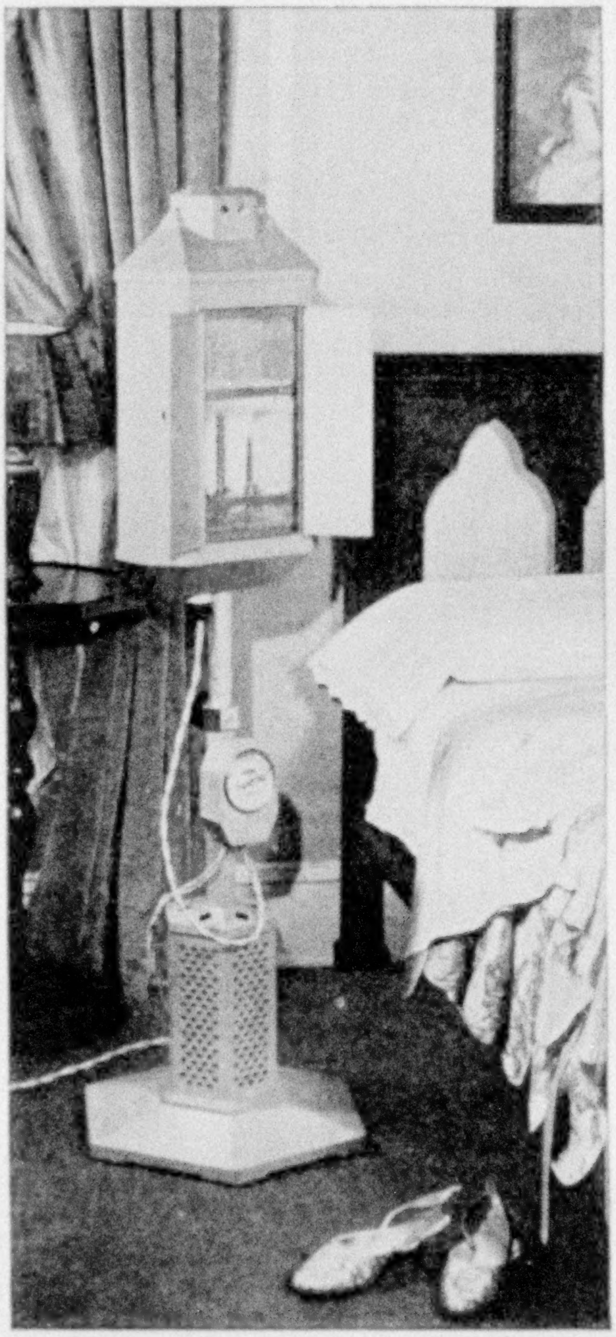
FOR the first time *in the history of motor car design an authentic system has been devised based upon the canons of ancient classic art*

CHRYSLER has found that there are so many glorious precedents and inspirations in art, architecture and design, that the search for authentic and harmonious symmetry can actually be reduced to something like a scientific system in which results are certain . . . Chrysler has deliberately sought to do something never done before in motor car design—to search out *authentic* forms of beauty which have come down the centuries unsurpassed and unchallenged and *translate* them in terms of motor car beauty and motor car utility . . . The lengths to which Chrysler designers have gone in this patient pursuit of beauty will doubtless prove a revelation to those who have probably accepted Chrysler symmetry and charm as fortunate but more or less accidental conceptions . . . The Chrysler process goes far deeper than any charming but accidental conception.



New Chrysler "75" Coupe (with rumble seat) $1535. Wire wheels extra.

Here
by your bedside, warm and glowing, is the Sun itself



Ask Your Physician

Snap the switch and you have wrought a miracle. Out of winter's darkness springs summer sunshine, glowing with all the warmth and vitality of June.

Only a lamp, you may say, but a lamp that is one of the triumphs of modern science, because it is in reality a miniature sun duplicating the essential rays which have made sunlight the source of life and energy for all mankind.

Turn on this light and expose your body to it. What is the result? First of all it will develop a healthy summer tan. But the real benefits are far deeper. The tide of health rises with the sun in summer, and the light of this Eveready Sunshine Lamp exercises a similar vitalizing influence that brings renewed strength and builds up resistance against illness. It is soothing to the nerves. It induces sound and restful sleep. It does for you what clear summer sunshine will do because it is exactly the same in all essentials. Reporting on tests of carbon arc light such as this, the U. S. Bureau of Standards said: "Of all the artificial illuminants tested, it is the nearest approach to sunlight."

Not only does this light have all the vital rays of the sun (ultra-violet, infra-red and visible light rays), but it has them in the same proportion as natural sunlight, which scientists agree is a most important requirement.

Because it is simply sunlight, the Eveready Sunshine Lamp burning Eveready Sunshine Carbons may be used with beneficial results by anyone who is not actually ill. It is particularly valuable to growing children and to adults who wish to avoid physical depression. In case of illness your physician should be consulted before using any light treatment.

A very interesting booklet, "Making the Summer Sun Stand Still," will be mailed free to anyone who is interested. Write to

NATIONAL CARBON COMPANY, Inc.
Cleveland, Ohio

Unit of Union Carbide UCC *and Carbon Corporation*

The new Eveready Sunshine Lamp plugs into any convenience outlet, and comes complete with two pairs of special goggles and ten Eveready Sunshine Carbons, ready to operate. Price, $137.50. Sold by electric light companies, electrical merchandise shops, department stores and physicians' supply houses.

EVEREADY Sunshine Lamp

Eveready Sunshine Lamp

EVEREADY Sunshine Carbons

The most beautiful, largest and most powerful Knight-engined car ever offered at such low prices

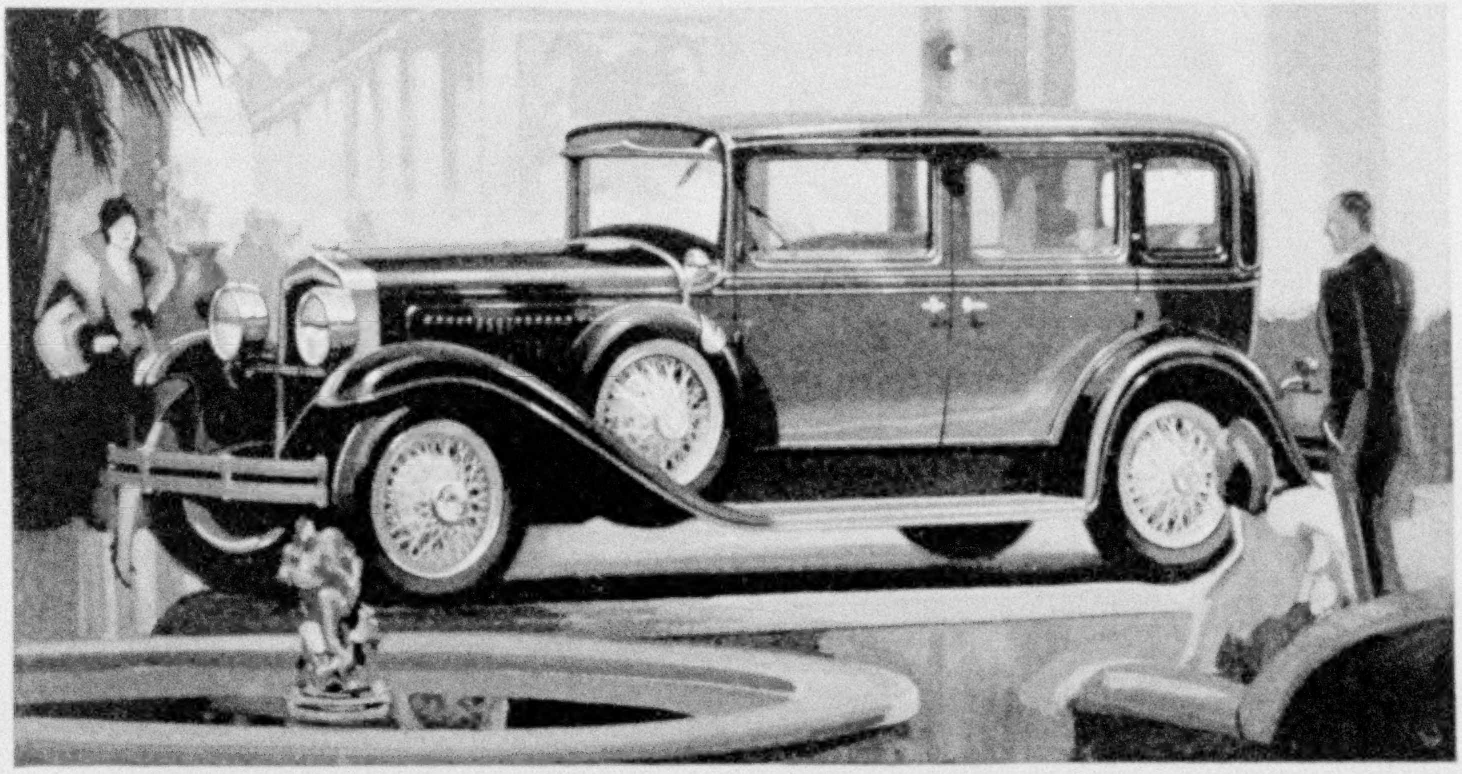
THROUGH quantity production, improved manufacturing and merchandising methods and volume sales, it is now possible to present the largest, most stylish and most powerful Willys-Knight Six ever offered at so low a price—a value that breaks through the cost barrier!

Fashioned to the minute, the new Willys-Knight Six is distinguished by sweep and verve of line, harmony of color, perfect symmetry and proportion that make it the outstanding creation of today's style specialists.

And of course, the new Willys-Knight Six is notable for the velvet smoothness, silent power, rugged stamina, sustained high speed, flashing activity, marked economy and increasing efficiency which have won for the *patented* double sleeve-valve engine its high regard with America's most experienced motorists.

Visit your nearest Willys-Overland dealer and see the new Willys-Knight Six. Your first glance will reveal its beauty of design. An inspection will reveal a wealth of tasteful appointments. A demonstration will simplify the problem of deciding what car your next one shall be. *And the low price will win your instant decision.*

WILLYS-OVERLAND, INC., TOLEDO, OHIO
WILLYS-OVERLAND SALES CO., LTD., TORONTO, CANADA



Five-passenger Sedan—(Wire Wheels Extra)

.. NEW DODGE SENIOR . .

the largest, handsomest and finest product in Dodge Brothers history

The NEW Dodge Senior was the first creation of Dodge Brothers under the auspices of Walter P. Chrysler.

Built in Dodge Brothers plants—under the guiding genius of this master of modern engineering and craftsmanship—it is well worthy of a heritage so eminently fine.

Its refreshing lines and distinctive interiors cannot be seen without a feeling of intense admiration. Nor can you drive this fine, large car without responding enthusiastically to the thrill of its performance.

In the whole world of great motor cars, there is none quite like the new Dodge Senior. It has the inimitable spirit of all Chrysler achievement, and that sterling dependability which never fails to characterize Dodge Brothers cars.

BUILDING
THE FORTRESSES OF
HEALTH

One of a series of messages by Parke, Davis & Company, telling how the worker in medical science, your physician, and the maker of medicines are surrounding you with stronger health defenses year by year.

The dearest two in the world!

MEDICAL Science has not yet completely dispelled all danger in child-bearing—perhaps it never will. But around the motherhood of today it has built a powerful protecting fortress of scientific equipment, of asepsis, of anesthesia, of obstetrical skill, of pre-natal and post-natal care.

The battle against indifference and dogmatism

Less than a century ago, child-bed fever was considered a mysterious "accident" or "act of Providence."

"But it is no accident, this menace that carries off thousands of mothers," said Semmelweiss, a young Hungarian physician, to a skeptical and scoffing world in 1847. "It is an *infection*—and I can tell you how to prevent it!"

Semmelweiss died broken-hearted, crazed by ignorant criticism and opposition—yet not before he had demonstrated the effectiveness of his method. Working in a Vienna maternity ward he was able in a single year to reduce the child-bed fever loss from one in ten to one in a hundred.

Slowly the doctrine of preventable infection gained ground. The discoveries of Semmelweiss, Lister, and others led finally to modern *asepsis*—surgical cleanliness—nowhere of greater value than in the protection it offers to women in childbirth.

Parke, Davis & Company know of no greater responsibility, no greater opportunity to serve humanity, than is offered by the privilege of preparing the medicines required in modern obstetrical practice.

Every needed resource of a vast organization, every measure of precaution known to science is used in our laboratories in making, in testing, and in safeguarding the purity of the Parke-Davis medicines relied upon by physicians in helping to bring new lives into the world.

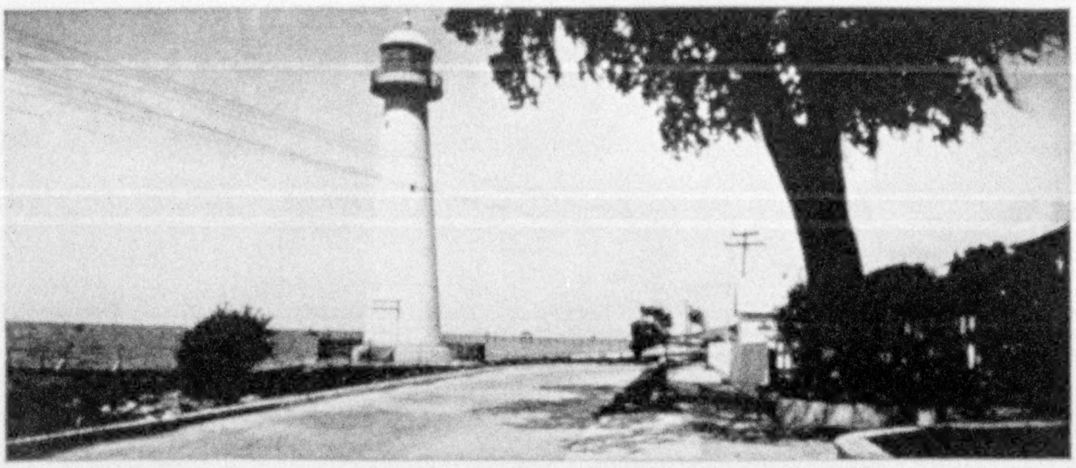
Spoonfuls of Summer Sun

Physicians say that next to clear summer sunlight, vitamin-rich cod-liver oil best promotes strong healthy bones and sound teeth in growing children. Parke-Davis Standardized Cod-liver Oil is so rich in vitamins that each teaspoonful contains as much Vitamin A as 1 pound of the best creamery butter, or 11 pints of whole milk, or 9 eggs; and as much Vitamin D as 7.5 eggs.

Parke-Davis Cod-liver Oil is light in color and so *pure* that it is practically odorless. It is also free from harmful fats, and is so highly refined that it leaves no unpleasant after-taste. Children find it much easier to take. Ask your druggist for Parke-Davis Standardized Cod-liver Oil.

PARKE, DAVIS & CO.

The world's largest makers of pharmaceutical and biological products



The sun-kissed and flower-laden shores of the . . .
GULF COAST

beckon you away from the snow and ice—away from cloudy, muggy weather, down where there is so much of historic interest and scenic beauty, and where all outdoor sports are at their best.

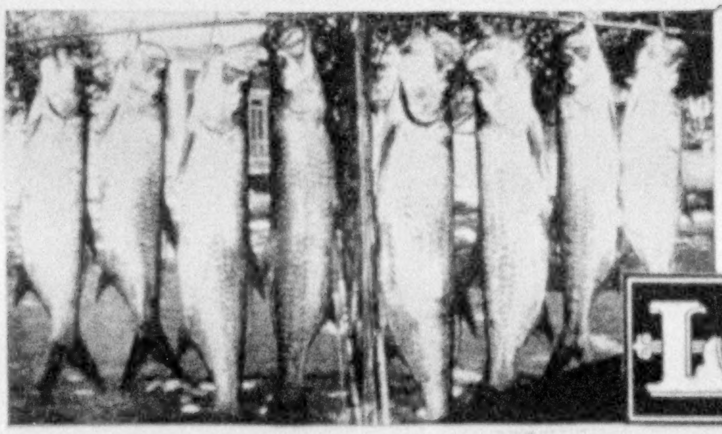
Now's the time to catch big fish, to sharpen up your golf game for spring, to explore the semi-tropical forests on a splendid Kentucky thoroughbred, to motor along the deep, blue waters of the Gulf, to limber up through a few sets of tennis, and to fit yourself for spring and summer.

Splendid hotels, with moderate charges and every type of accommodation from the most inexpensive rooms to the most luxurious suites, dot the Coast from the Apalachicola River in Western Florida to the City of New Orleans. The climate is ideal—little rain—just cool enough to be invigorating and to permit outdoor sports every day. Splendid health-giving artesian well water and pine-laden ozone will send you back home in tip-top shape.

Write today to R. D. Pusey, General Passenger Agent, Louisville & Nashville Railroad, Room 322-D, 9th and Broadway, Louisville, Ky., for booklet and complete information about the Gulf Coast and how to reach it on splendid L. & N. trains.

The Singing River

The Gulf Coast is a land of legend. For instance, here's one of them: "When the Biloxis, the Pascagoulas, the Pensacolas, and other Indian tribes roamed and ruled the Gulf Coast, there was great rivalry between them. The Pascagoulas were warriors of greatest skill and highest caste. However, legend has it they were surprised, out-numbered, and defeated by the Biloxis and their Braves all killed. Proud and loyal, the Pascagoula women were unwilling to be ruled over by any conquering tribe. Taking their babes in their arms, they walked down to the river singing. Into the deep waters they went until drowning stilled their voices." Today weird but musical tunes come from the singing river.



L&N

LOUISVILLE & NASHVILLE R·R

Baby's Health *demands*

that foods be kept at those temperatures provided unfailingly by Frigidaire

HOW carefully you watch and guard the foods your baby eats. But what about refrigeration? It is one of the most important and vital factors in baby's health.

Physicians everywhere agree that safe refrigeration means temperatures well below 50 degrees. Frigidaire provides these temperatures . . . unfailingly. It is powered to meet every emergency in the hottest of weather or the warmest of kitchens . . . powered to hold safe temperatures day after day, month after month, and year after year.

Cleanliness, too

This surplus power means the difference between certainty and doubt, the difference between absolute protection and worry. And this is one reason why there are more Frigidaires in use today than all other electric refrigerators combined.

Still another safeguard to health is provided by the New Frigidaire . . . cleanliness. The lining is of seamless porcelain enamel. Inside and out the entire cabinet is as easily cleaned as a china plate.

Consider these features

See the New Frigidaire. Only then can you appreciate all that it offers. See the beauty of the cabinet. Note the simplicity of operation. Listen for the sound of the motor. You don't hear it start, stop, or run. Get the facts on low prices and the liberal G.M.A.C. partial payment plan. Call at the nearest Frigidaire display room.

Write for this book

May we send you a copy of our book on healthful refrigeration? Photographs taken through the microscope tell an interesting and convincing story of what happens to food at different temperatures. A copy will be mailed on request. Frigidaire Corporation, Subsidiary of General Motors Corporation, Dayton, Ohio.

FRIGIDAIRE

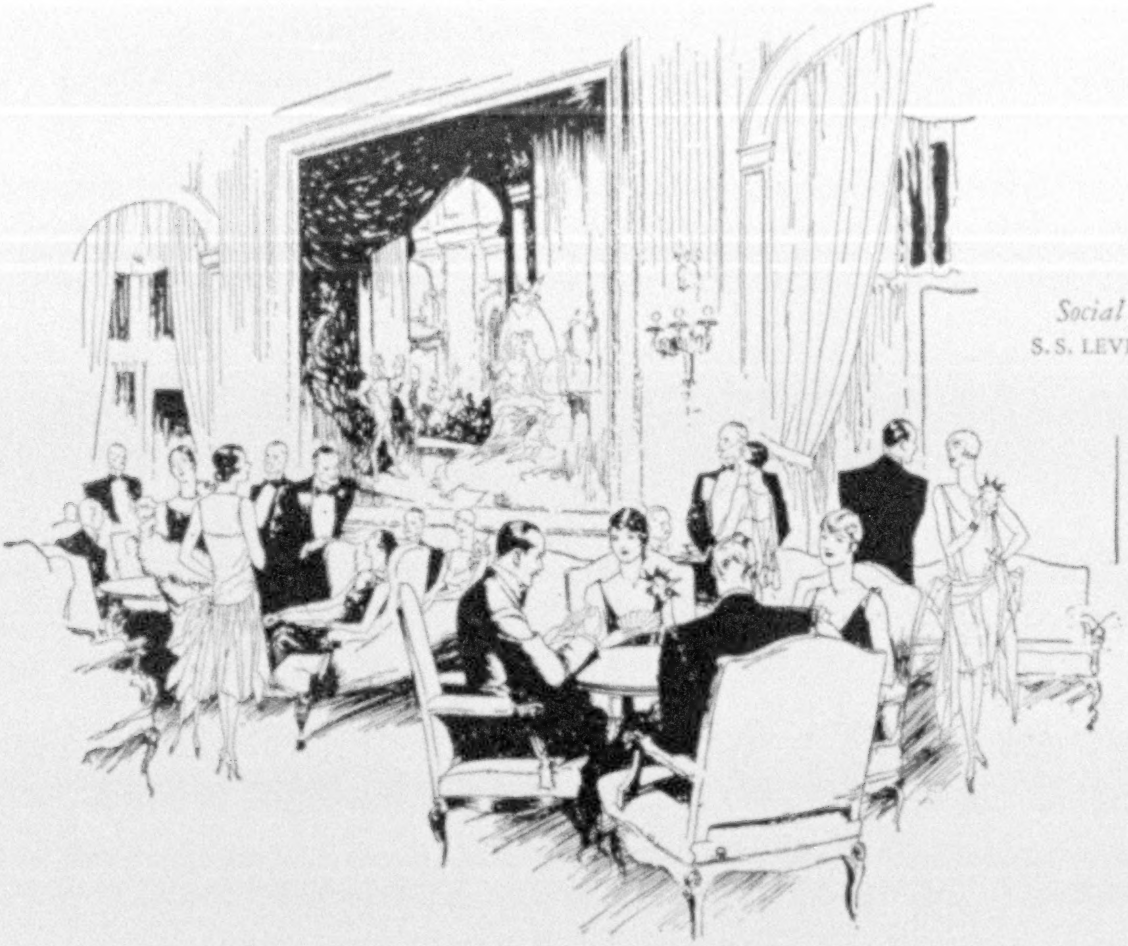
PRODUCT OF GENERAL MOTORS

FRIGIDAIRE CORPORATION,
Dept. Y-313, Dayton, Ohio.
Please send me your book on healthful refrigeration.

Name..

Address..

Town..............................*State*..................



Social Hall
S. S. LEVIATHAN

Those who know select United States Liners

AMERICANS go to Europe on American ships because they recognize *value.* They want atmosphere, of course. But they demand essential comfort first of all: unquestioned cleanliness; honest Yankee treatment; real service; the highest standards of living in the world, because they're used to them at home. They find these standards on American ships. *And in addition*, an atmosphere of luxury and refinement that is unsurpassed on any trans-Atlantic liner afloat.

For those who want a speedy crossing, at low winter rates, there's the *Leviathan,* the world's largest ship; six days and you're over there. If you prefer a day or two longer at sea, your steamship agent will gladly recommend one of the delightful cabin ships, the *George Washington, America, Republic, President Harding,* or *President Roosevelt.* Many of the travel-wise sail second class, or tourist third cabin, for even greater economy. That's just why they *are* travel-wise.

United States Lines

FORTY-FIVE BROADWAY, NEW YORK CITY

UNITED STATES SHIPPING BOARD

Lovely pearls that gleam and glisten are yours to possess when cloudy film is removed from lovely teeth.

The Film

that discolors the whitest teeth

Are your teeth dull, lustreless? Are you prone to tooth and gum disorders? Then remove film this scientific way.

(Send coupon for free 10-day supply)

MODERN dental research has recently thrown a new light on two common conditions.

Dull teeth are traced to a dingy film which ordinary brushing does not effectively combat.

Many serious tooth and gum disturbances are traced almost as completely to the same source—*film*.

Thus an utterly different way of tooth cleansing is being adopted by thousands, known as Pepsodent. A free ten-day supply is offered you.

Germs, tartar, pyorrhea, decay

Run your tongue across your teeth. You will feel a film; a slippery, slimy coating.

This film absorbs discolorations and makes white teeth dull and dingy.

Germs breed and multiply in that film. The acids of decay are invited. Film hardens into tartar. And germs, with tartar, are a proved cause of pyorrhea.

Now film removed new way

The new-found agents in Pepsodent curdle and loosen film so that light brushing takes it off. Thus the long and vigorous brushing necessary with old ways now is ended. Its use aids in firming gums and restoring healthy color.

Give Pepsodent free 10-day test

Get a large tube wherever dentifrices are sold. Or send coupon to nearest address for a ten-day tube to try. Make this test and see teeth lighten.

Pepsodent

The Special Film-Removing Dentifrice

FREE
10-DAY
TUBE

Mail Coupon to

The Pepsodent Co.
Dept. 192,
1104 S. Wabash Ave.
Chicago, Ill., U. S. A.

Name.................................

....

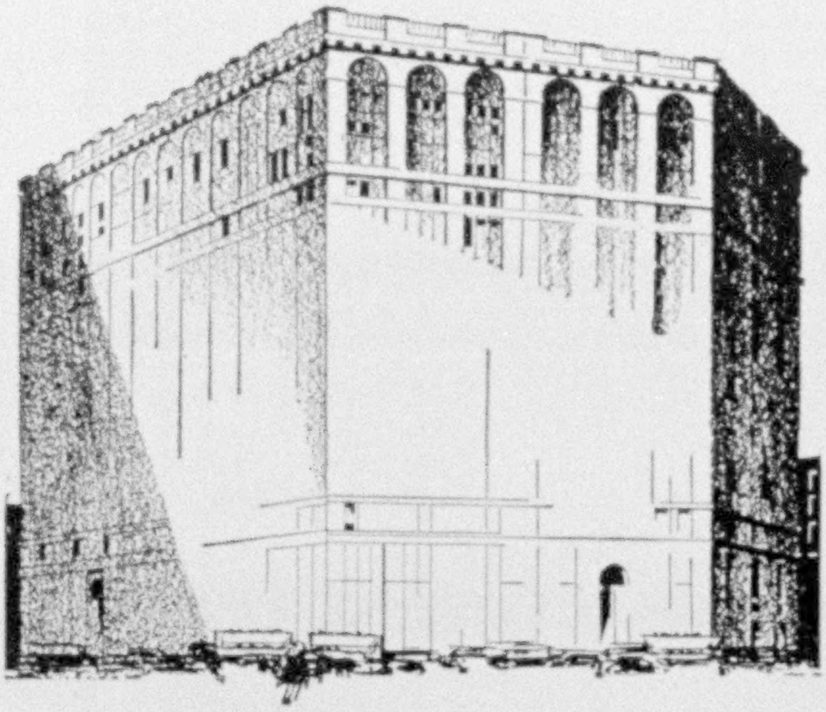
Address.................................

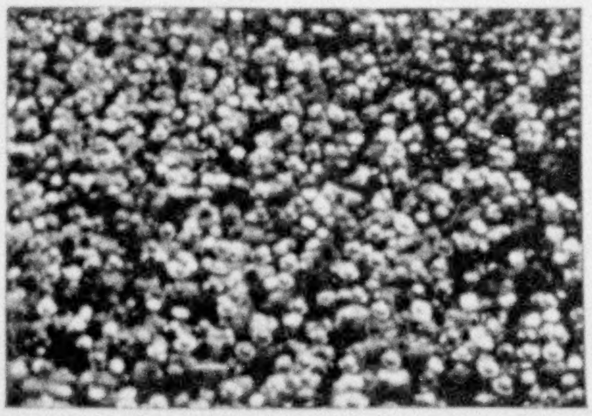
City...

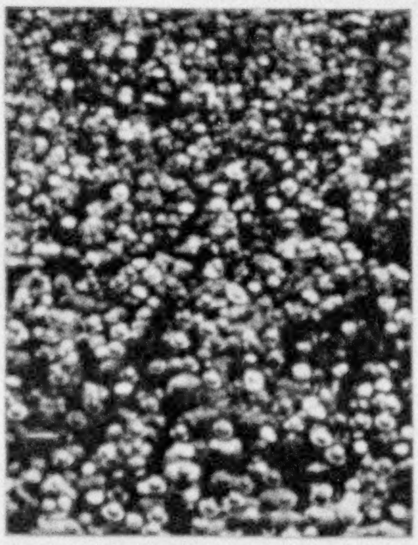
Other Offices: The Pepsodent Co., 191 George St., **Toronto** 2, Ont., Can.; 42 Southwark Bridge Rd., **London**, S. E. 1, Eng.; (Australia), Ltd., 72 Wentworth Ave., **Sydney**, N. S. W.

Only one tube to a family 3083

Experienced buyers will favor your address . . . if it is The Fifth Avenue Building, New York







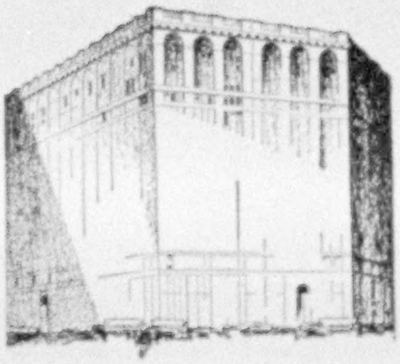
SITUATED where Broadway meets Fifth Avenue, at the light and airy space of Madison Square, The Fifth Avenue Building is in the midst of New York business. The building is accessible from anywhere in the city. Busses, surface cars and a subway entrance are at the door . . . an elevated line is within a block . . . Grand Central Station is thirteen minutes by subway, the Pennsylvania Station, ten.

This address was widely known before business had absorbed downtown New York. On this site stood the old Fifth Avenue Hotel, a fashionable meeting place for the smart world thirty years ago. In those days the prestige of this location was a social asset.

Now, it is a business asset just as great.

Experienced out-of-town buyers, from this country, and from distant points, make The Fifth Avenue Building their New York buying headquarters. They come here to buy fine laces, men's wear, women's wear, toys, novelties, pottery, glassware, greeting cards, stationery, and similar lines. They can complete here many of their seasonal requirements on a single buying trip.

With offices in The Fifth Avenue Building, you are in close touch with a great part of the buying world . . . a world that knows and likes the address. We should be glad to show you through the building.



THE FIFTH AVENUE BUILDING

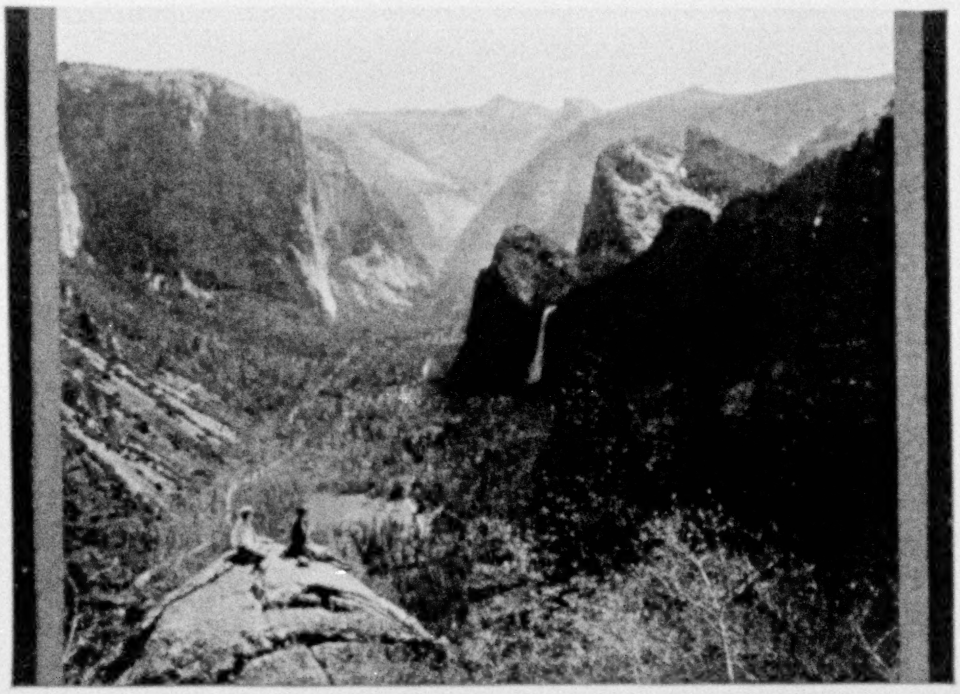
Broadway at Fifth Avenue, at Madison Square, New York

"More than an office building"

The dream that *must* come true

CALIFORNIA*

for your next vacation



YOSEMITE VALLEY, FAMED ROUND THE WORLD, A FEW HOURS ONLY FROM SAN FRANCISCO

Lifting their rugged crests to the sky of deepest blue, sheer walls of granite, magnificent in their beauty, rise on all sides from the floor of Yosemite Valley. A few hours' distance by marvelously scenic highway is the Mariposa grove of Big Trees,—magnificent veterans of two, three and five thousand summers and winters. Almost in their shadow you can play golf,—golf a mile in the air, in a setting of alpine glory.

California calls to you,—calls to you *this summer.* A vacation spent in this famed playland will be one of *double profit.* For you will have good chance to study the state's practical opportunities. Tens of thousands arrive in California every year, for a holiday, and find the business opening that permits them permanently to remain, with their families, "where life is better."

Plan your trip by way of—

San Francisco

This city is the central gateway to the Pacific Coast. Behind it are spread, fanlike, the Redwood Empire with its mystic groves and gamey streams; mountain-high lakes, geysers and petrified forests; several national parks; thousands of square miles of national forest for camping and fishing; scenic rail lines and motor highways; and the long, foaming coastline of the blue Pacific. Over-seas, just a few days' jaunt, lies Hawaii.

San Francisco is itself a holiday city of sparkling interest. It is the coolest summer city in America. Average temperature in summer 59°, and it doesn't rain. San Francisco is ringed with golf courses. At one of these, the Pebble Beach course on Monterey Bay, (5 hours distant), the 1929 national amateur golf tournament will be held, September 2 to 7.

Low round trip excursion rates to San Francisco and the Pacific Coast will be in effect on all railroads beginning May 22, return limit October 31. The Victory Highway (U. S. Highway No. 40) will be in good condition. Or you can come by air, or by steamship via Panama Canal.

Let Californians, Inc., a non-profit organization of institutions and citizens, send you a book of sumptuous illustrations and travel information—"California Vacations." It is free.

*"WHERE LIFE IS BETTER"

CALIFORNIANS, INC.
Dept. 502
703 Market Street, San Francisco

You may send the free book on California vacations at once to:

Name..

Address..

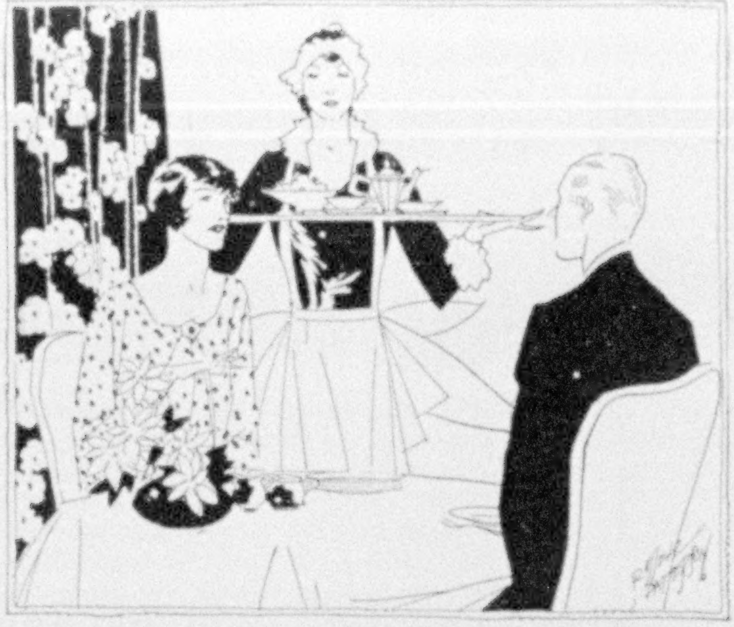
Broad motor highways in Glacier Park lead to points of awe-inspiring beauty

GREAT NORTHERN

Visit Glacier
NATIONAL PARK

You can hike or ride through valleys carpeted with bear grass, glacier lilies, and myriad other wild flowers. Majestic, glacier-clad peaks may be climbed—flashing snow-fed lakes and streams will yield full creels—or you can camera-hunt for Rocky Mountain goats, bighorn sheep, and other game life. After visiting Glacier Park and Waterton Lakes National Park see Spokane, Seattle, Tacoma, Portland, Vancouver, Victoria, Rainier National Park, Mt. Baker National Forest and other alluring vacationlands of the Pacific Northwest. Low summer fares. For illustrated books and full information write A. J. Dickinson, Passenger Traffic Manager, Room 720, Great Northern Railway, St. Paul, Minn.

GREAT NORTHERN



The Story of a Wise Wife

whose husband is named John

For a long time she had realized that coffee was thieving the sleep of the family. But she hated even the thought of giving up the drink they all liked so much. And as for John—she knew he'd welcome the idea of a coffee substitute about as willingly as an operation!

One day she read an advertisement—and that night a new brand of coffee came to dinner. It was delicious coffee—so good everybody took a second cup.

And next morning, wonder of wonders! Even John remarked on the good night's sleep he'd enjoyed! She, like a wise wife, merely made conversation. Not until a week later did she tell about the new coffee. It was Kaffee Hag Coffee—the coffee that lets you sleep because it has 97% of the drug caffeine removed.

Perhaps there's someone in your family whom coffee makes nervous. Try this wonderful coffee. Kellogg's★ Kaffee Hag Coffee is a blend of the world's finest coffees. Exceptionally mellow and delightful. With all the flavor and cheer you love. Real coffee! But it will not keep you awake nor affect nerves.

Order a can from your dealer. Comes ground or in the bean. The original caffeine-free coffee. Try it at hotels, on diners. Or let us send you a generous sample can. Mail the coupon.

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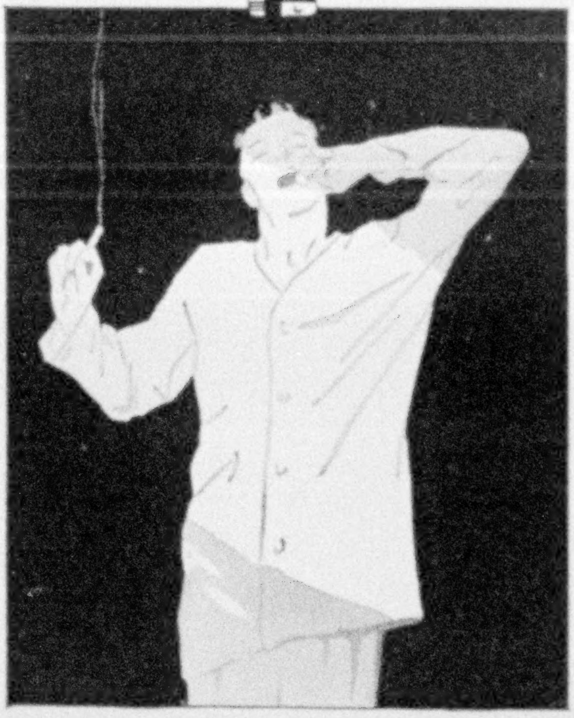

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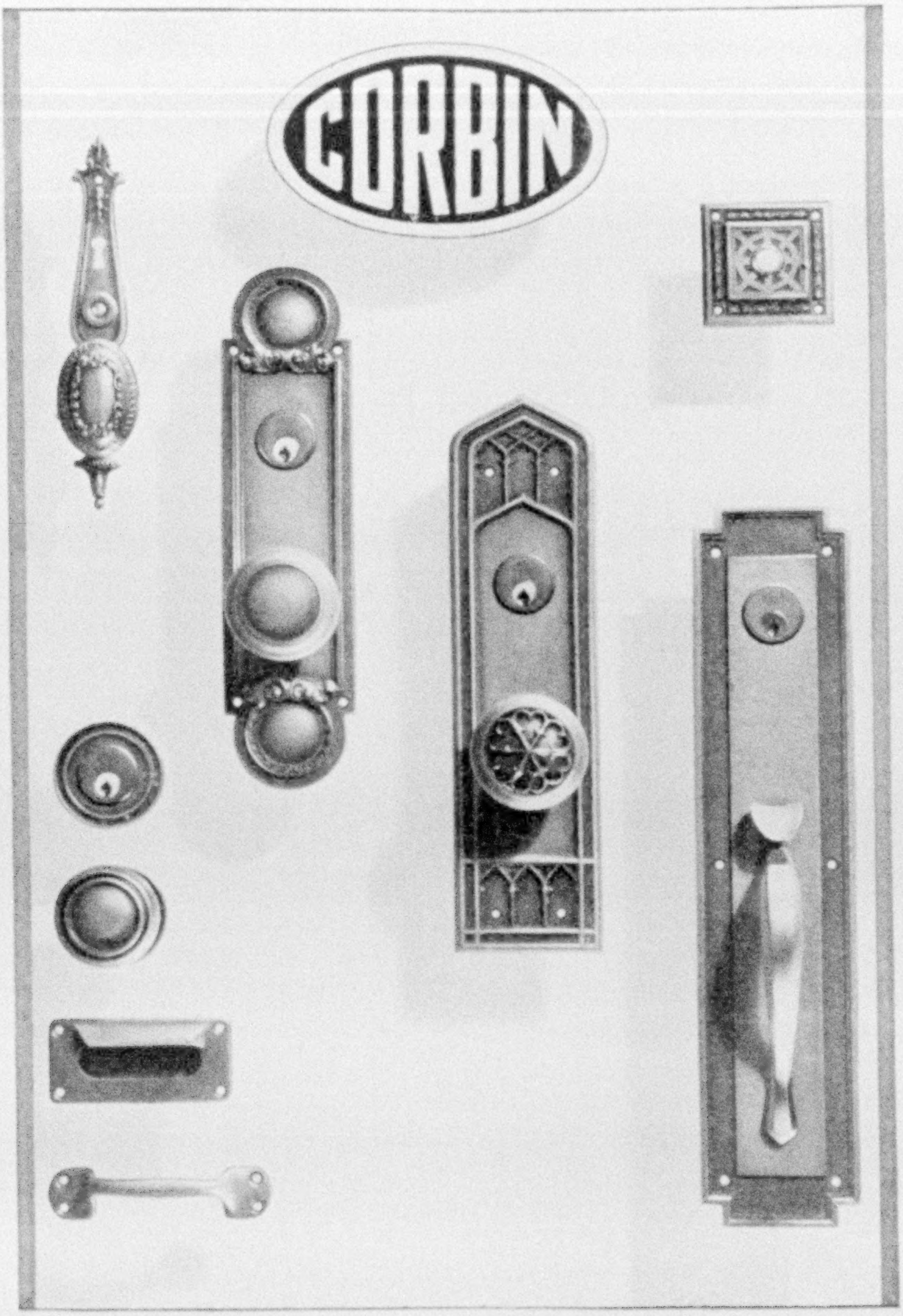

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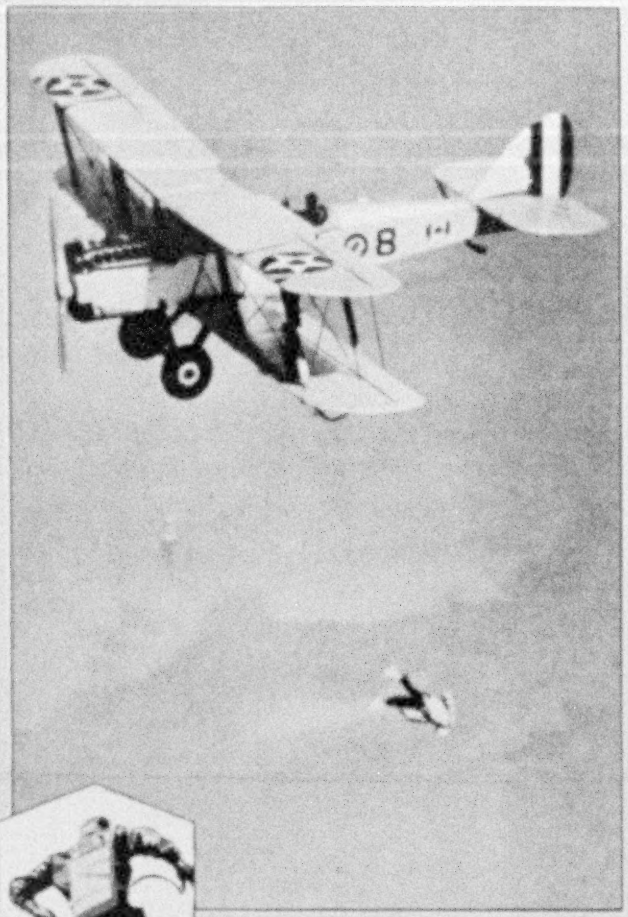

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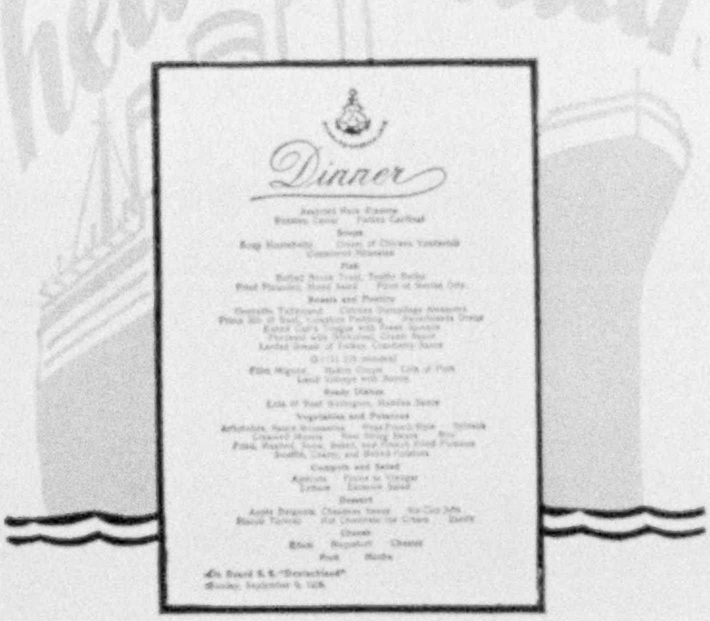

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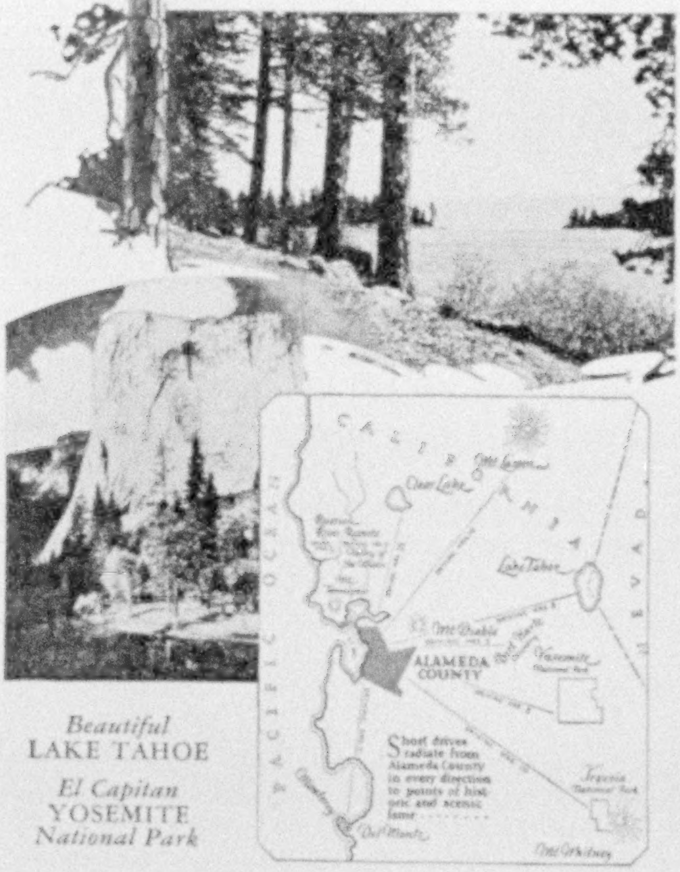

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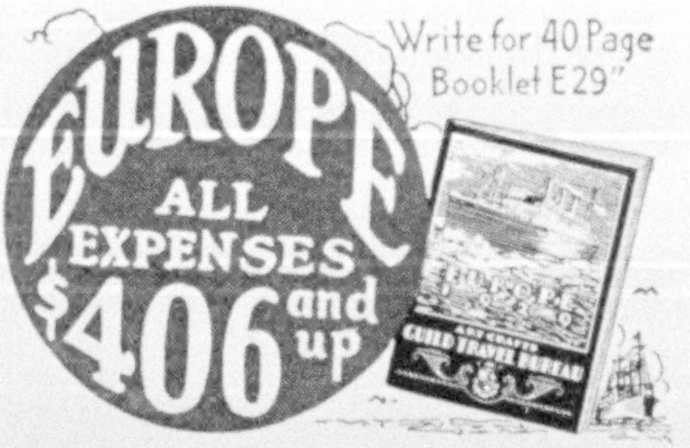

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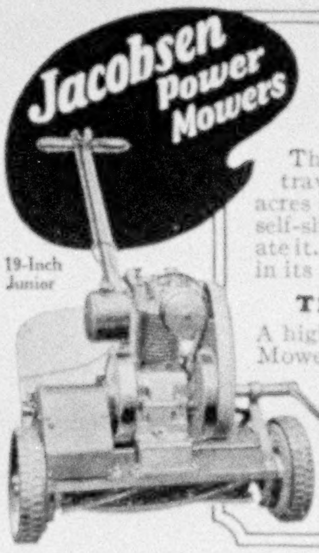

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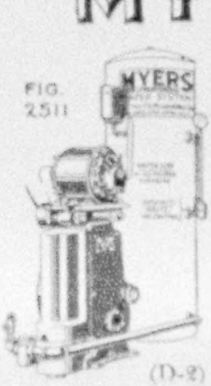

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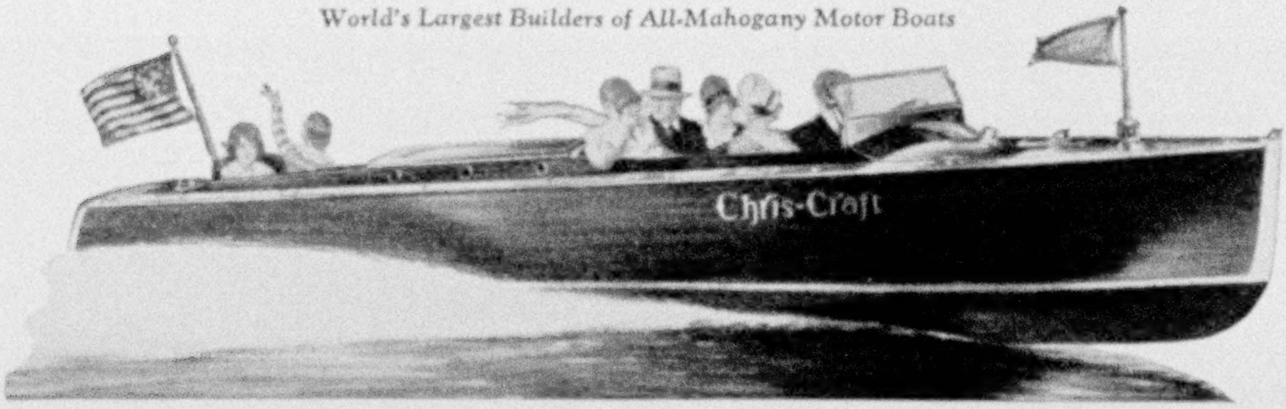

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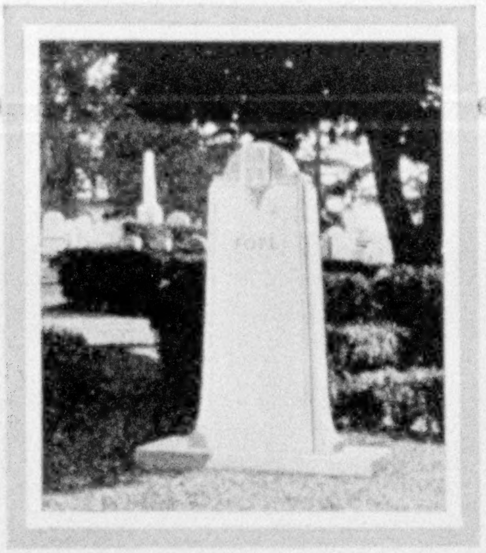

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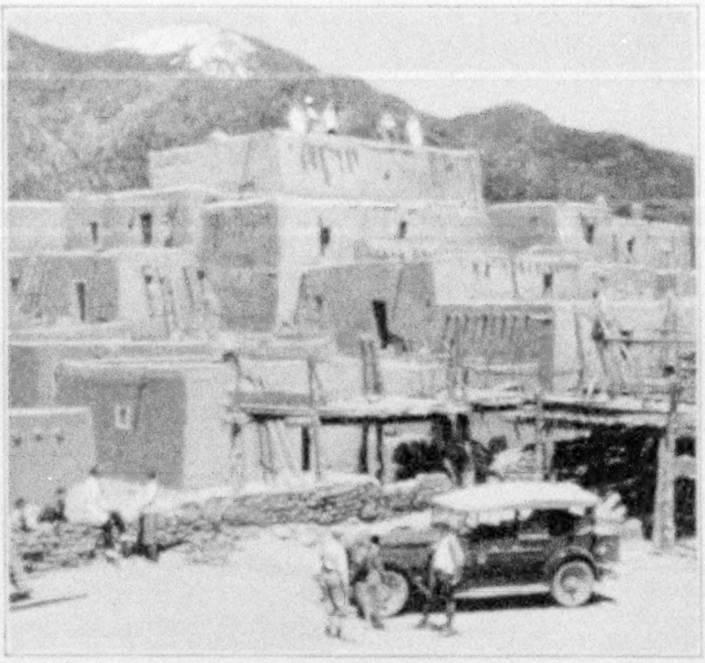

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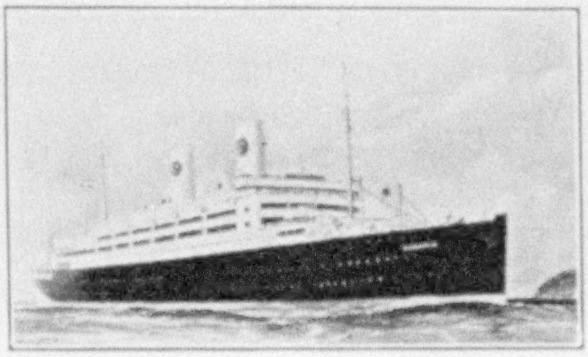

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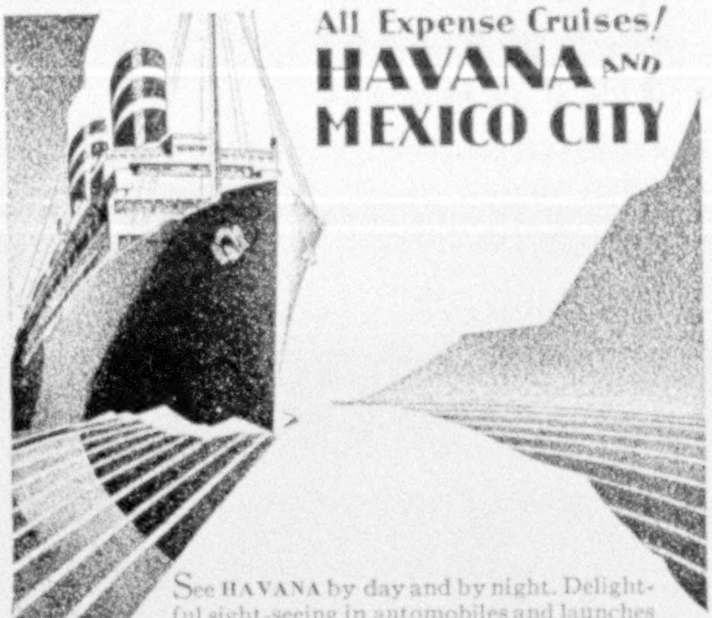

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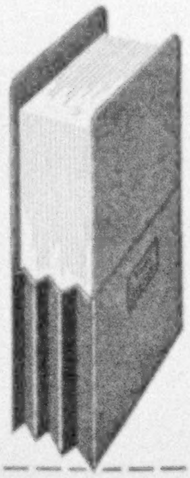

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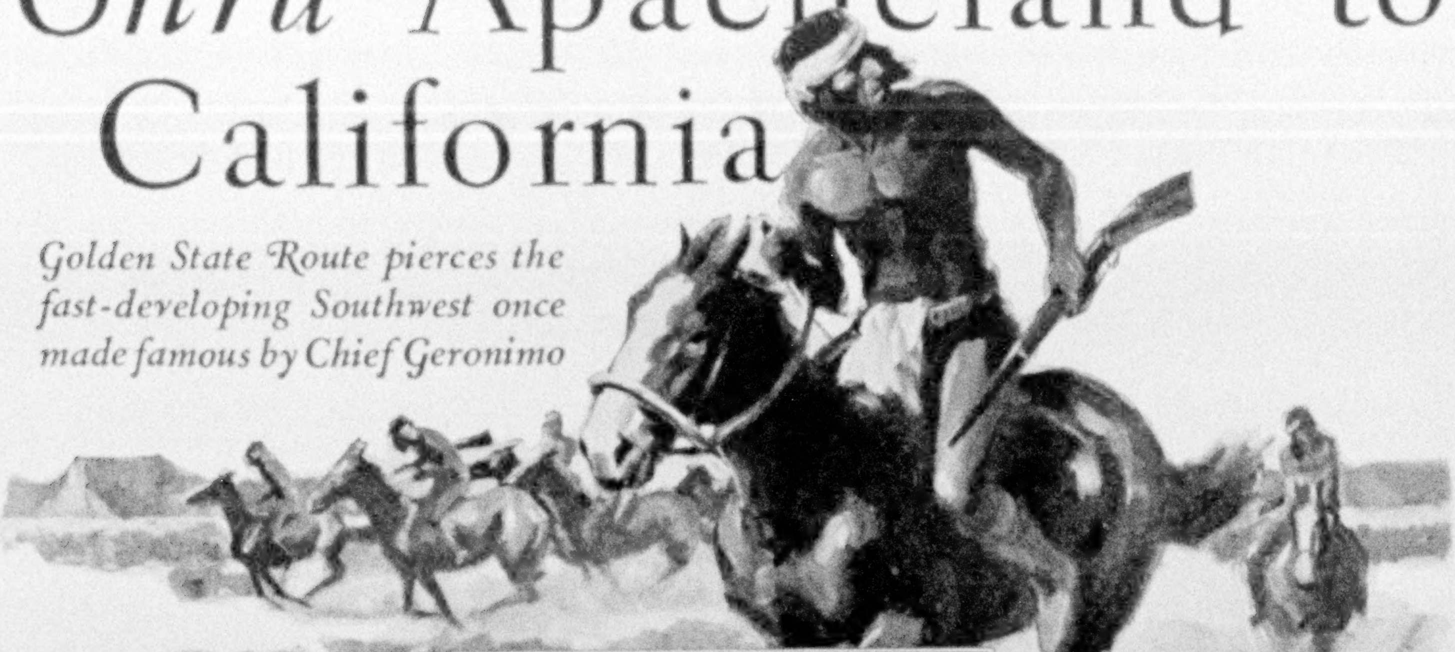

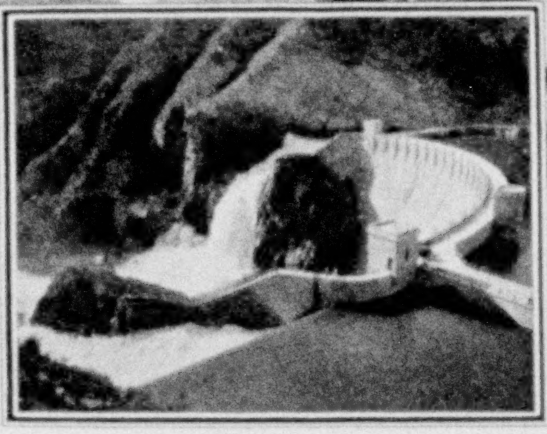

The mighty Roosevelt Dam, on the Apache Trail, stores life and wealth for the desert

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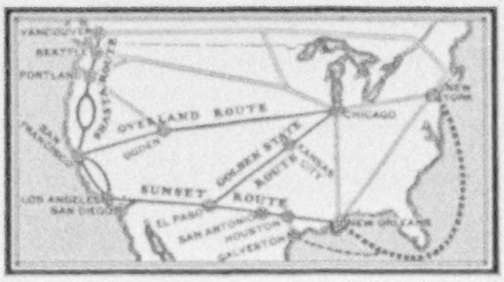

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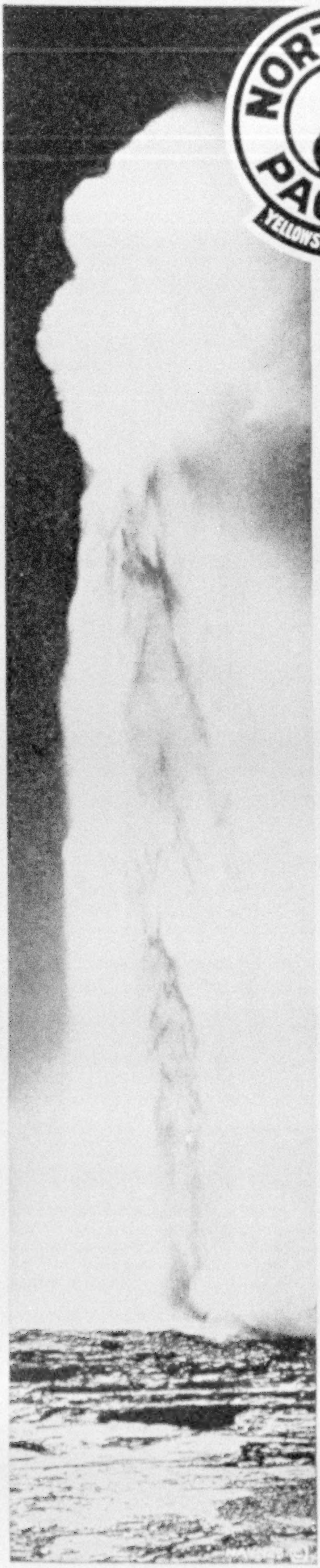

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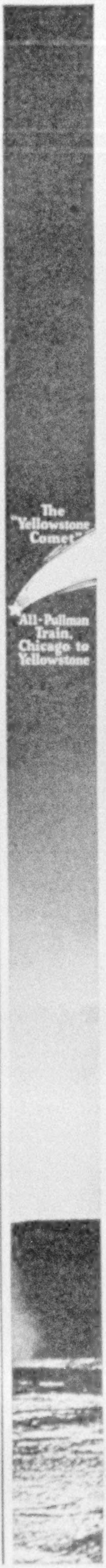

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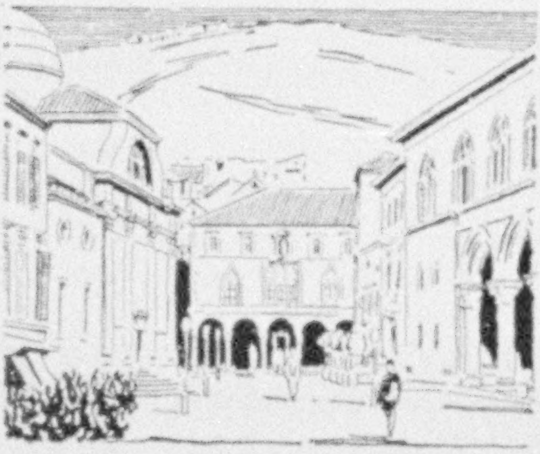

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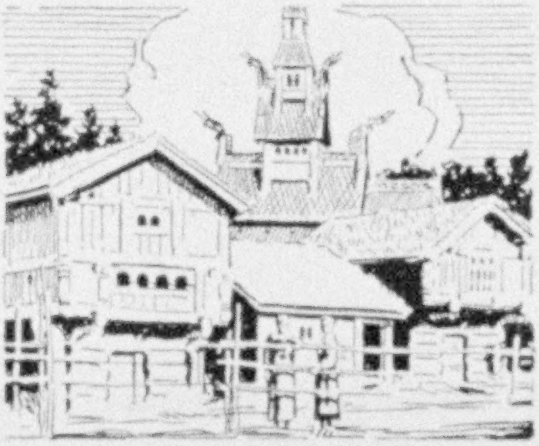
North Cape Summer Cruise



¶ The complete northern cruise — ninth in the Raymond-Whitcomb annual series — with visits to far-away *Iceland,* the *North Cape* and the spectacular *Fjords of Norway,* to *Trondhjem* and *Bergen, Oslo, Stockholm* and ancient *Visby* in the Baltic, to *Finland* and *Esthonia.* A nine-day side trip will go to *Leningrad* and *Moscow.* Sailing on the Cunard liner "Carinthia," June 26, 1929.

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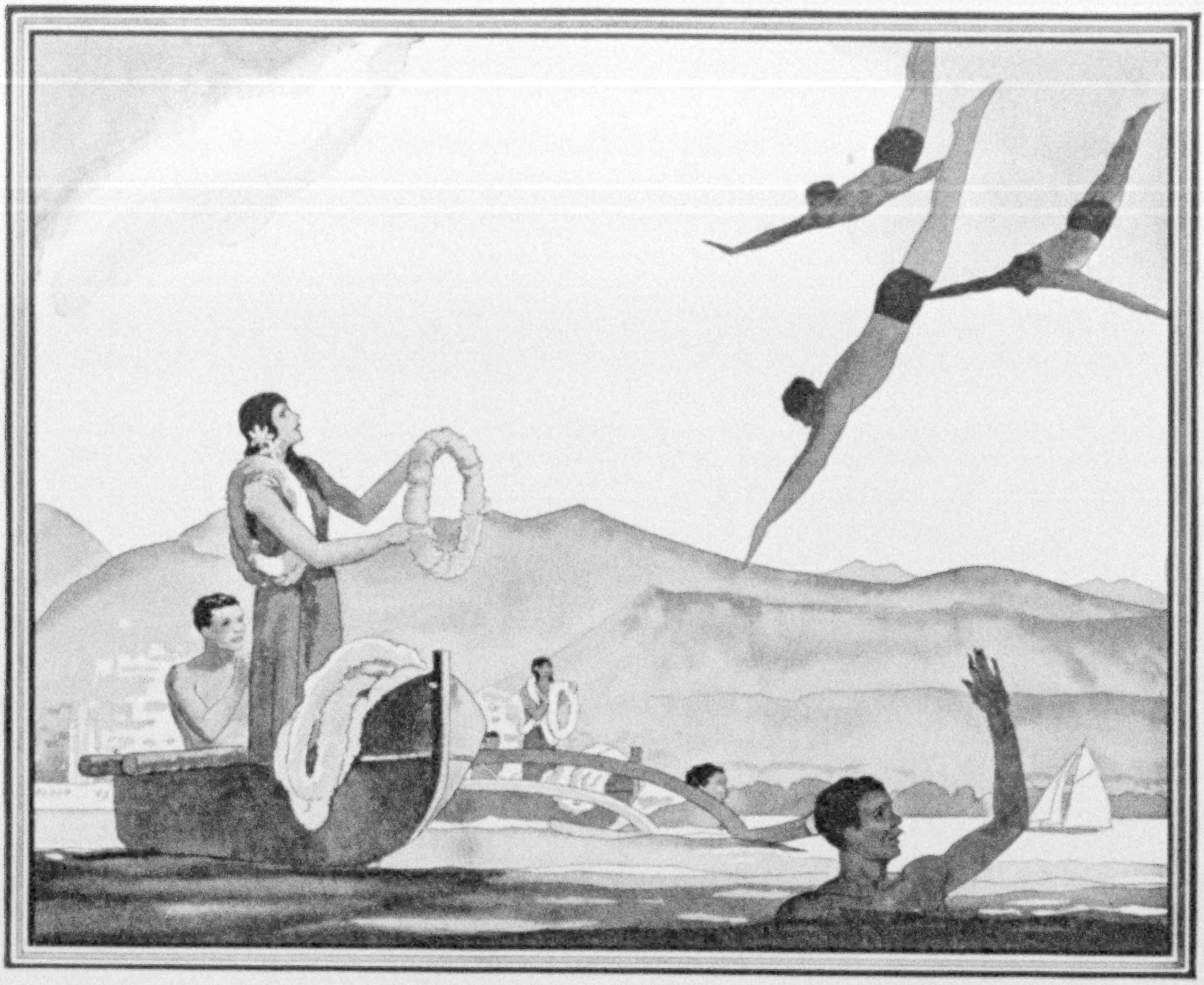

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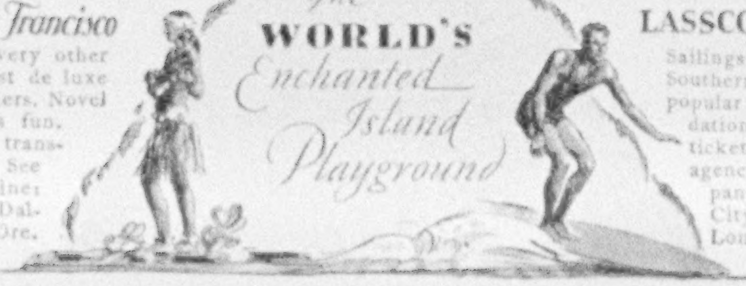

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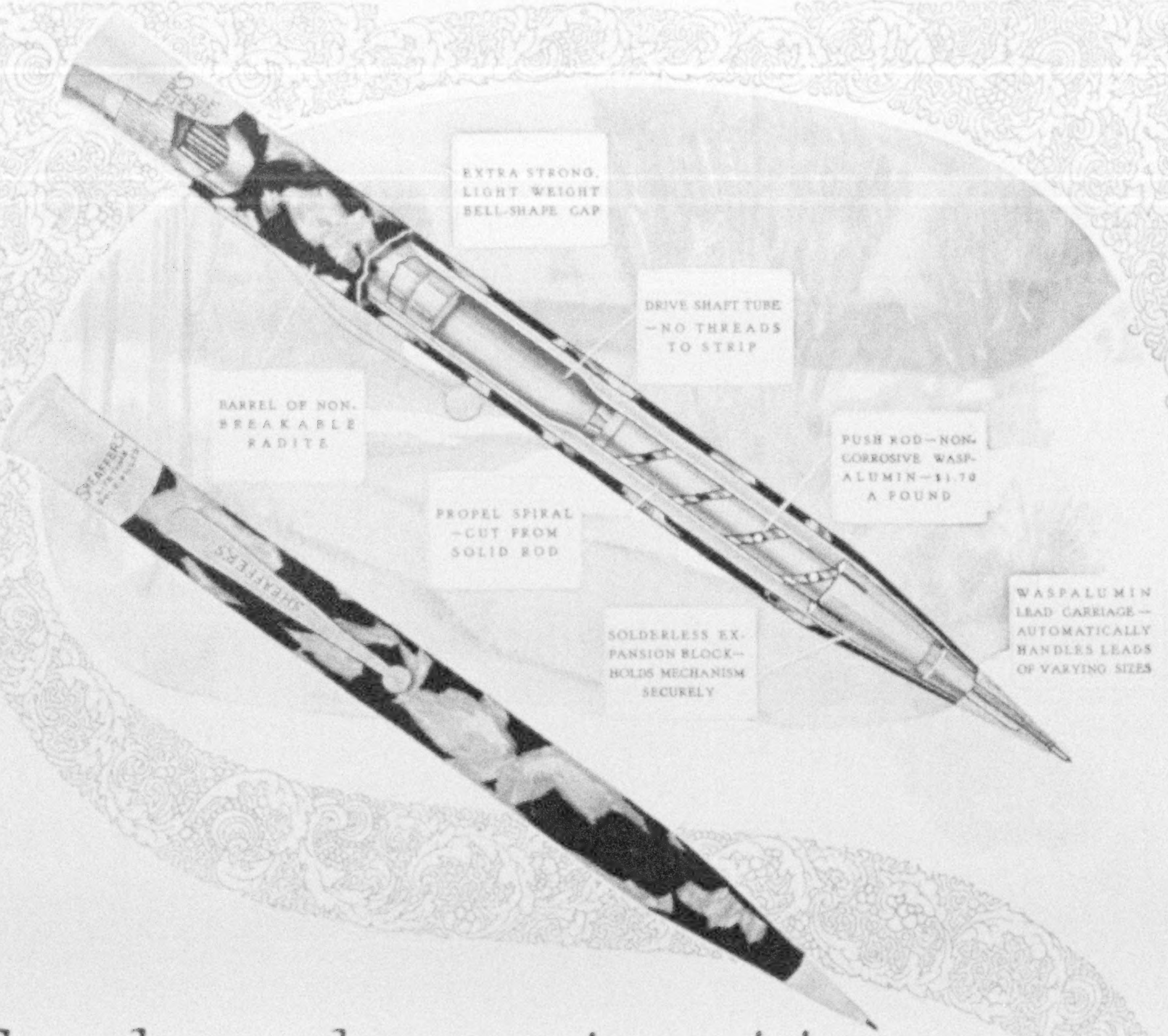

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